the Iron Age
A Chilton Publication
THE NATIONAL METALWORKING WEEKLY • MAY 26, 1955

What's behind Europe's business boom?
See page 51

MESTA High-Speed
CONTINUOUS PICKLING LINES

MESTA 60" CONTINUOUS PICKLING LINE INSTALLED AT THE INDIANA HARBOR WORKS OF THE INLAND STEEL COMPANY

Designers and Builders of Complete Steel Plants
MESTA MACHINE COMPANY— PITTSBURGH, PA.

A PINCH OF LEAD FOR FAST, CLEAN CUTTING

Lead added to Aristoloy Steels acts as a lubricant and reduces friction between tool face and chip. It also produces a better chip formation, allowing higher machining speeds to be employed. Many users report improved machinability ratings, up to 100 for leaded steels as compared to 60 or 70 for the same material unleaded.

Better finish and longer tool life are additional benefits. Heat treating and mechanical characteristics remain unchanged.

Call your local representative or write today regarding application of leaded Aristoloy to your product.

ARISTOLOY STEELS

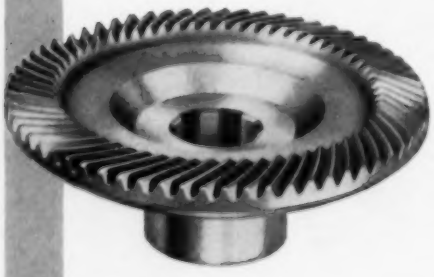
COPPERWELD STEEL COMPANY
(STEEL DIVISION) WARREN, OHIO

BALL STUD

Use of 8640 Leaded improved automatic screw machine production nearly 40% for a large job shop. Production per machine hour increased from 108 to 150 pieces.

SPUR GEAR

A machine tool manufacturer cut machining time ⅓ by switching to Aristoloy 4140 Leaded. And finish was greatly improved—from FAIR to EXCELLENT.



SPIRAL GEAR

Machinability was increased 25% when Aristoloy 4140 Leaded was substituted for non-leaded AISI equivalent. Biggest saving from a cost standpoint was a 75% improvement in tool life.

SEND FOR FREE BOOKLET ON LEAD-TREATED ALLOYS

THEY'RE EASY TO WELD Bethlehem Flanged-and-Dished Heads are easy to weld because they are made from grades of steel of uniformly high quality. What's more, they come in a range so wide as to meet virtually every requirement. Styles: ASME Code flanged-and-dished, standard, elliptical, flanged-only, dished-only, shallow-dished, tank car, obround and double-dished. Diameters: up to 144 in.; Thicknesses: 14 gage to 3½ in. Bethlehem also produces standard manhole and handhole saddles, covers and fittings, and collar and pipe flanges. We also furnish heads having flued openings and machined edges. The nearest Bethlehem Sales office will be pleased to furnish full details.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

The Iron Age

DIGEST OF THE WEEK

Starred items are digested at the right

EDITORIAL

What's Wrong With Patriotism? 7

NEWS OF INDUSTRY

*Special Report: Europe's Boom Opens Markets.. 51
*Manufacturing: Truckmakers Study LP Gas.... 54
*Mining: Coal Industry Must Mechanize 55
*Materials Handling: Chicago Show Stirs Ideas. 56
*Financial: Congress Goes After Mergers..... 58
*Transportation: Railroads Take On New Look.. 59
Construction: Earthmovers Face Big Job 60
Industrial Briefs 66
Personnel: Iron Age Salutes 81
Iron Age Introduces 83
Clearing House 166

NEWS ANALYSIS

Newsfront 49
*Report to Management 65
Automotive Assembly Line 68
This Week in Washington 73
*West Coast Report 77
*Machine Tool High Spots 79

TECHNICAL ARTICLES

*Anodized Coatings: How They Behave 91
*Production Control Keeps Shipments on Schedule 95
*Gear Shaper Cuts External Teeth Simultaneously 98
*Facsimile System Speeds Plant Communications 100
*Rare Earths Improve Impact Properties of 430.. 103
Technical Briefs 116

MARKETS & PRICES

*The Iron Age Summary—Steel Outlook..... 143
*Steel Product Markets 144
Comparison of Prices 145
Iron and Steel Scrap Markets 146
*Nonferrous Markets 150
Steel Prices 152

REGULAR DEPARTMENTS

Dear Editor 9
Fatigue Cracks 11
Dates to Remember 13
Free Literature 108
New Equipment 127

INDEX OF ADVERTISERS..... 173

Copyright 1955, by Chilton Co. (Inc.)

THE IRON AGE, published every Thursday, with an additional issue in June, by CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1923, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies, 50¢. Annual Review Issue, $2.00. Cables: "Ironage." N. Y.

Address mail to 100 E. 42 St., N. Y. 17, N. Y.

NEWS DEVELOPMENTS

TRUCKMAKERS TAKE LONG LOOK AT LP GAS—P. 54
Liquefied petroleum gas, once sold mainly in bottles for home stove use, is coming in for some serious consideration by truck makers. Last year the number of trucks designed to use LP gas was twice the year previous. Major design objections are disappearing and prospects look bright.

COAL MECHANIZATION IS A MUST — P. 55
Coal mines are spending millions on new, mechanized equipment. Giant continuous miners cut costs, increase output. Larger units for stripping are also in use. Mechanized mines are able to show profits.

MATERIALS HANDLING SHOW BREEDS IDEAS — P. 56
Over 30,000 attended Materials Handling Exposition in Chicago. Experts told visitors to stop dreaming about new plants and make the best of what they have. Radio communication systems attract usual attention. Vacuum lifting device draws considerable inquiry. The problem of freight charges for pallets is easing some.

CONGRESS TAKES TOUGH LOOK AT MERGERS—P. 58
Senate and House committees get ready to probe merger wave. FTC report comes in for criticism for lack of action following study. Manufacturing and mining led in number of mergers. Automotive unions approved as necessary to cut costs.

RAILROADS GET SET FOR FACE LIFTING — P. 59
Lightweight metals and streamline design are key points in a railroad modernization program coming up. Object is to boost revenues and cut costs. More comfortable cars are aimed at attracting customers. Weight reduction and new design will cut maintenance and operating costs.

ECONOMIC CRITICAL POINT APPROACHES — P. 65
Next few weeks will tell how key labor and market situations will go. But no need for pessimism in either direction. Consumer market strong through summer. Labor settlements without strike are in the cards. Credit buying is high, but delinquencies are low.

AUTOMAKERS TALK MACHINE TOOL DESIGN—P. 79
Survey of General Motors mechanics gives detailed listing of what automakers want in machine tools. Anything that will make maintenance easier will be welcome. Performance needs cover a wide range of operations. Greater standardization is called for with wartime conversions requiring interchangeable parts.

IN METALWORKING

ENGINEERING & PRODUCTION

ANODIZED COATINGS IN MODERN FINISHING—P. 91
Formation of an anodized film on aluminum depends on certain conditions. Hydrogen formation in the pores complicates the interpretation of these conditions. Impurities and alloying elements in the metal affect the oxidation potentials. Film appearance is also affected by metal composition, methods and electrolytes.

HOW CONTROL KEEPS SHIPMENTS ON TIME—P. 95
Booming business in large plants producing tailor-made items can often mean delivery delays. To cure such headaches, one company installed a simple but effective production control system. Target dates, a better method for follow-up have boosted efficiency.

NEW MACHINE SPEEDS GEAR TEETH CUTTING—P. 98
Gears up to 20 in. in diam can be cut at volume production rates with a new special cutting machine. Up to 15 lb of steel chips can be removed in 6½ minutes. The equipment is versatile, highly accurate and designed for tooling changes in 25 to 45 minutes. Final shaving may be eliminated for many large gear applications.

FACSIMILE SPEEDS PLANT COMMUNICATIONS—P. 100
Efficiency of interplant communications has been markedly improved at Chrysler Corp. through use of facsimile reproduction machines. The system, using leased telephone lines, permits fast, accurate reproduction of letters, drawings and other business papers. Sending speed is the equivalent of more than 400 words per minute. No retyping is necessary.

RARE EARTHS IMPROVE IMPACT PROPERTIES—P. 103
Rare earths can increase toughness without affecting hardness, recent studies of 4330 steel have shown. The resulting improvement in transverse impact properties could reduce service failures. Although the cost is high, future potential for such applications is promising, especially where optimum mechanical properties are required as in aircraft parts.

MARKETS & PRICES

EUROPE'S BOOM MEANS DOLLARS FOR U. S.—P. 51
Economic surge in West Europe is giving American businessmen a shot at new and expanding markets. But overseas competition is mounting too. Boom both here and abroad is putting pressure on metals supply, prices. Western Europe is developing scaled-down version of American consumer market.

WEST MUST EXPAND STEEL CAPACITY — P. 77
Anticipated increase in population, change from distributor to producer economy, makes more steel and pig iron capacity a necessity. Area lags behind in comparison to population. Talbott insists West will not lose its aircraft industry. Convair expands.

STEEL DEMAND HIGHBALLS INTO SUMMER — P. 143
Tempo of the steel market gives no sign of easing as the summer months approach. Products that have been in strong demand continue tight, while others—plates and structurals, for instance—are picking up strength. Consumers are interested in placing fourth quarter business, and producers are talking fourth quarter allotments in some cases. Normal mill customers are still pressing warehouses for emergency tonnages.

STEEL DEMAND CONTINUES VERY STRONG—P. 144
Despite a slight easing in merchant wire demand, the picture at the moment is one of acceleration in some products, continued strength in others. Plate and structurals are tight as the construction season hits its peak. Warehouse business is booming with distributors reported on bended knee for sheet and strip.

PRESS FOR ALUMINUM STOCKPILE DIVERSION—P. 150
With government probers giving aluminum a careful check to find out whether there is need for additional aluminum capacity and to look into charges that independents were not getting their fair share of the metal, pressure was developing to have the government divert more aluminum from the stockpile.

NEXT WEEK:

BETTER COPPER TUBING STARTS WITH ANNEALING
Accurate control over annealing cycles will give the grain size uniformity and scale-free surfaces so essential to the drawing qualities of copper tubing. At one plant this has been achieved with modern furnaces and an exothermic type atmosphere generator.

WHERE DO WAREHOUSES STAND IN STEEL BOOM?
Boomtime is traditionally a busy time for steel warehouses. Not only do normal customers order more but the mill overflow comes buying. Steel is certainly booming today. Are warehouses getting their customary extra load? Next week's special report gives facts and figures on this question.

FASTER, LOWER COST Hardening FOR ALL Engineering Steels

No other device approaches Ajax neutral salt bath efficiency in hardening steels . . . low carbon, high alloy, stainless, high-carbon high-chrome, high speed types . . . *because only Ajax protects the work so effectively from atmospheric effects.*

All air is "sealed out." A film of salt protects the work up to the instant of quenching . . . keeps the surface clean. Scaling, pitting, carburizing and decarburization are avoided.

LOW COST — First cost of equipment is only ½ to ⅛ that of any other production hardening system!

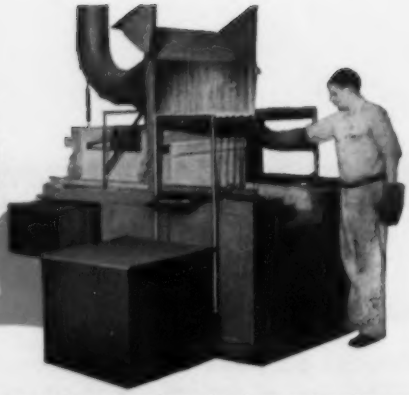
RAPID HEATING—Heating cycles from 4 to 6 times faster than in radiant type furnaces assure greater production in less time. Distortion is negligible.

UNIFORM RESULTS—*Uniform* physical properties result from *uniform* bath temperatures . . . and, in the Ajax furnace, a temperature variation of less than 5°F is held throughout. Smaller equipment in less space produces a given output. Unskilled labor can handle the entire process.

ADAPTABILITY—Selective heating is easily obtained by immersing only that portion of the work to be hardened. A unique method for hardening gear or sprocket teeth is to spin them in salt, immersing only the teeth.

WRITE FOR Ajax Catalog 116B, also list of documented case histories of hardening installations.

SEND your specimen parts to the Ajax Metallurgical Service Laboratory for treatment. No cost or obligation.



Full hardness with no decarburization (even under microscopic examination) of silicon-manganese steel gears is obtained by a machine tool producer in this Ajax salt bath installation.

Fast COMPLETELY MECHANIZED HARDENING

4-pound spline shafts loaded 4 shafts to a fixture, and up to 10 fixture loads at a time, are hardened at 1550°F. in a mechanized Ajax salt bath furnace. They are automatically quenched in water followed by a nitrate salt draw at 600°F. The Ajax furnace has operated day in and day out 24 hours a day for over a year without interruption.

5400 BLADES A Day

Good carving knives need exceptionally hard, tough cutting edges . . . and these blades of 440 stainless steel have them! 150 lbs. of work per hour, or 5400 blades per day, are handled in a single Ajax salt bath furnace by one unskilled operator.

MORE WORK IN Less Space

Aircraft landing gears of SAE-4340 steel up to 62" long are hardened in Ajax salt bath furnaces by immersing them vertically in baths 75" deep. Over 800 pounds of work are processed per hour . . . Great space savings afforded by treating pieces vertically. Austenitizing furnace, requires less than 70 square feet of space.

No Rejects

On a run of 30,000 rock bits hardened with Ajax salt bath furnaces, not one was rejected. Bit life was increased 4 to 5 times by comparison with a previous hardening method. Plain carbon steel rather than costly alloy steel is used . . . 480 lbs. an hour are treated in a bath with working dimensions of only 36" x 11" x 36"! Hardness never varies more than 1 point from Rc52.

AJAX electric SALT BATH furnaces

HULTGREN

Trademark.

World's largest manufacturer of electric heat-treating furnaces exclusively

AJAX ELECTRIC COMPANY 904 Frankford Ave., Philadelphia 23, Pa.

Associate companies: Ajax Electric Furnace Corp.; Ajax Engineering Corp.; Ajax Electrothermic Corp
In Canada: Canadian General Electric Co. Ltd., Toronto, Ont.

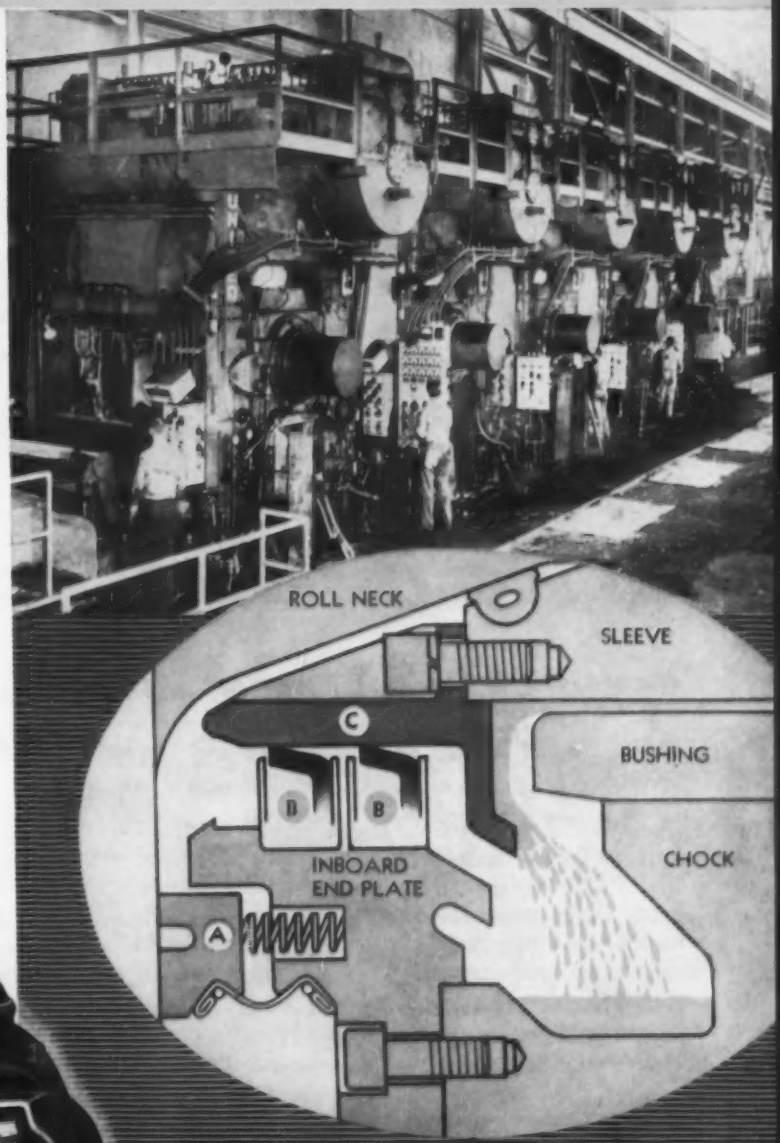
The MORGOIL FLINGER

Stops oil loss on mills using rolling lubricant

The water seal assembly "A" and oil seals "B" of a modern MORGOIL serve only one purpose — **to keep rolling lubricant out of the bearings.**

The rotating sleeve extension and flinger "C" throws all of the oil from the bearing into the drain sump. No more oil loss through worn seals.

This five stand tandem four-high cold mill at Kaiser Steel Corp., Fontana, California rolls on modern MORGOILS equipped with sleeve extensions and flingers.



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WORCESTER, MASSACHUSETTS

ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL

English Representative
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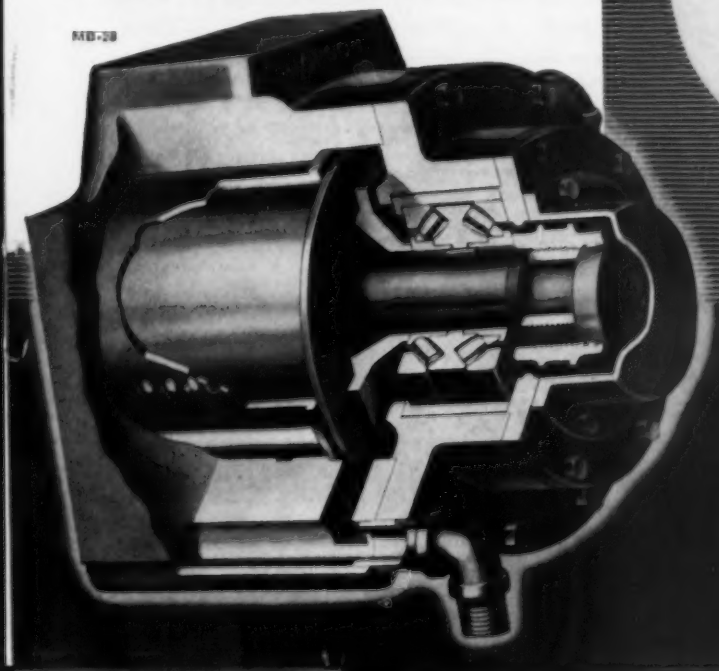
MB-28



MORGOIL

the best Roll Neck Bearing you can buy

Stainless castings show up to 190,000 psi strength after 875 F hardening treatment

Foundries report ultimate tensile strength as high as 190,000 psi in investment castings of Armco 17-4 PH Stainless Steel. This precipitation-hardening grade is easy to cast. It fills thin sections and details nicely, surface finish is good and tolerances small.

READILY MACHINABLE Armco 17-4 PH investment castings machine readily to an excellent surface finish. The subsequent 1-hour hardening treatment at 875 degrees F will not distort the part nor damage the surface. It causes only a slight discoloration.

NUMEROUS SUPPLIERS Armco does not make castings. If you are interested in high-strength, low-temperature hardening castings with high corrosion resistance, just fill out the coupon. We'll send you a list of suppliers of investment castings and other types made of Armco 17-4 PH Stainless Steel.

Armco Steel Corporation 1345 Curtis Street, Middletown, Ohio
Send me a list of producers of castings of Armco 17-4 PH Stainless Steel.

Name:_____

Firm:_____

Street:_____

City:_____ Zone:_____ State:_____

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

Editorial:

What's Wrong With Patriotism?

◆ WE LOVE OUR allies. We recognize that some of them may not be with us in the years to come. But we are practical in our belief that we cannot stand alone as the Communists build up to a showdown some day.

We believe in helping our allies to help themselves. Also it is clear to us that we must assist them from a military standpoint just the same as we build our own defenses. None of us is foolish enough to believe that we are doing all of this just out of the kindness of our heart.

We admit that we need allies in order to keep the Free World going on the basis that we and others believe in. Those of us who read the writing on the wall and who have a long memory spurn appeasement no matter what form it might take. While we become stronger and pray for peace we still have our fingers crossed on the Kremlin's intentions.

But in believing and acting in this worldly fashion there is nothing evil or sinister in saying that we have in America a great country. Or that we have a heritage to be proud of. The pioneer spirit is still with us. Our country was founded on individual freedom and equality.

It is time that the old-fashioned parades, uncovering when the flag goes by and tales about our heroes came back into vogue with a bang. Check your street this Memorial Day and on the Fourth of July. How many American flags are flying? You'll be amazed.

This is one world but that doesn't mean we have to submerge patriotism for our country in order to be cooperative or internationally minded. There is nothing to apologize for in a national spirit based on the deeds of patriots, sufferings of our founders and the realization of what we have struggled for—dignity and freedom for the individual under democratic processes.

We don't have to brag about our machines and our high standard of living. But we can look with pride on the growth of our country. We do stand for elimination of colonialism, for the support of free but weak peoples and for strong resistance to slave dictatorships.

There may be much for which we can be criticized. But sincerity and championing the underdog are two things in which we excel.

Tom Campbell

EDITOR

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LET US TUNE UP YOUR SPRINGS
SMALL STAMPINGS
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WIRE FORMS

dear editor: *letters from readers*

Why Write Editorials About . . ?

Sir:

I think your editorial in THE IRON AGE of April 7 (Why Write Editorials About . . .?) is a fine job and I hope it will be possible for you to continue your good work for a long time to come.

It has always been my opinion that editorials in trade and business magazines such as yours were even deserving of wider distribution than is possible through the regular channels—it is most unfortunate that they could not have a better circulation and receive more attention in our educational institutions starting even in the grammar school grades.

I think your editorial comments concerning Communism, the use and misuse of public money acquired by taxation, etc., have been of the highest order and I hope you keep up the good work. I fail to see where there is anything approximating competition between trade journals and newspapers, as a matter of fact, we should actually be encouraging all of our editors and writers of opinions to keep us even better posted on matters of business and politics which concern not only our present but our future.

It should not be too difficult to understand that we will benefit from any knowledge we can acquire concerning anything that affects the inner workings of our economy since our entire wealth comprises the conversion of our natural resources by the application of labor and machinery to products for sale and use. *F. A. Knapp, Glenshaw, Pa.*

Ceramic Bearings

Sir:

We noted mention in your April 21 issue under Newsfront of ceramic antifriction bearings. Could you give us further details as to whom is doing the work on this development? *T. B. Ludlow, Chemical Engineer, Bemis Bro. Bag Co., Dept. of Physical Research, Minneapolis.*

Further information may be obtained from Robert F. Rea, Manager, Research & Development Branch, Stupakoff Ceramic Mfg. Co., Latrobe, Pa.—Ed.

Stainless Steel

Sir:

Can you tell us whether or not there is available a breakdown of stainless steel grades for welding in the years 1953 and 1954, similar to the reprint of THE IRON AGE issue of July 17, 1941?

This article had special reference to the popularity of stainless analysis and grades, geograpical distributions, and ultimate application.

Any information you can furnish relative to the above would be very much appreciated. *R. C. Towner, Asst. Purchasing Agent, The Lincoln Electric Co., Cleveland.*

We suggest you contact National Electrical Manufacturers Assn., 155 E. 44th St., New York 17, N. Y. for this information.—Ed.

Air Gaging

Sir:

Will you kindly send us two sets of tear sheets on "Air Gaging Proves Economical for Short Run Parts" which appeared in THE IRON AGE, April 7 issue?

And will you, at the same time, grant us permission to reproduce this article by Multilith? It will be distributed to our selling force and others. Full credit will be given to IRON AGE. *C. G. Nobis, Advertising Dept., The Sheffield Corp., Dayton, Ohio.*

here are 10 "reasons why" you'll be interested in

DI-ACRO* ROLLERS

1 Cam actuated idler roll—an exclusive feature—makes it possible to form small circles in one operation.

2 Larger circles are formed in two operations. No limit to maximum radius.

3 Bends are located at any point in metal—with straight sections on both sides of the bend.

4 Material other than sheet is also formed. Special rolls supplied for special forming jobs.

5 Eight models. Rated capacity to 16 gauge. Forming widths from 6" to 42".

6 Di-Acro Rollers are easy to operate.

7 Adjustments can be "locked in"—hundreds of parts precisely duplicated.

8 Long, trouble-free service, all machines backed by warranty.

9 Engineering Service at your disposal for the life of the machines.

10 Delivery is good. Cost is too.

*pronounced Die-ack-ro

LIKE MORE INFORMATION?

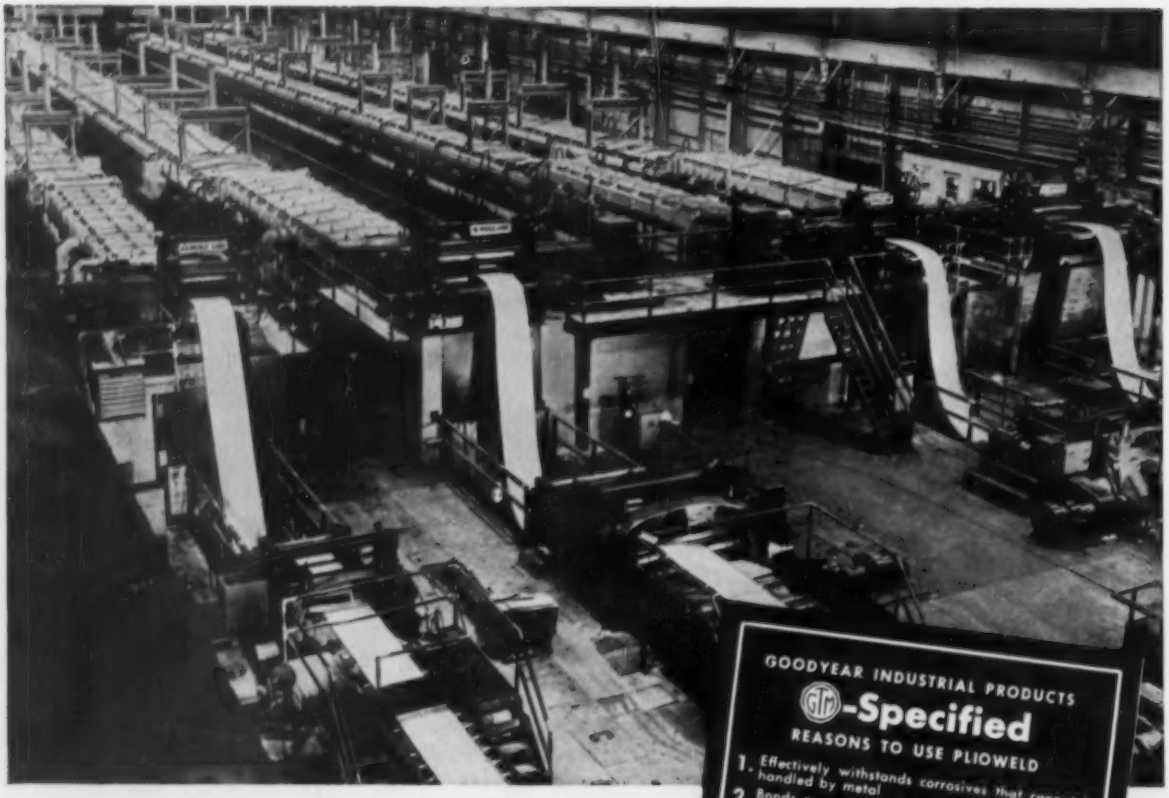
Send for 32-page Catalog

Gives complete details on Di-Acro Rollers, Brakes and hand and power operated Benders, Notchers, Punch Presses, Rod Parters and Shears. Write now while the thought is still fresh in your mind. No obligation, of course.

Creators of "DIE-LESS DUPLICATING"

O'NEIL-IRWIN MFG. CO.
302 8th Avenue
Lake City, Minnesota

di-acro PRECISION METALWORKING MACHINES



GOODYEAR INDUSTRIAL PRODUCTS

G.T.M.-Specified

REASONS TO USE PLIOWELD

1. Effectively withstands corrosives that cannot be handled by metal
2. Bonds permanently to metal surfaces—an exclusive Goodyear process
3. Does not split or loosen with vibration or severe external impacts
4. Does not crack or buckle under alternate wetting or drying or temperature changes
5. Surface will not disintegrate or slough off—cannot contaminate in-process materials
6. Protects product from discoloration, iron pickup and other contamination
7. Each installation specially formulated to provide maximum protection against chemical handled

PROVED PROTECTION

for pickle line comes with

PLIOWELD

Acid tanks. Hot and cold water tanks. Tank covers. Piping. Drip pans. Fume ducts. Fume scrubbers. Exhaust fans. Stacks and breeching. These are the points in a pickling line that can be thoroughly protected against chemical attack with rubber bonded to metal—with PLIOWELD.

Secrets of the proved success of PLIOWELD in combating corrosion—and abrasion—are its availability in a range of compounds to meet specific needs and its permanent bond to metal. PLIOWELD does many jobs well and once on the job, it stays there.

Whether your problem is handling acids or alkalies, salts, alcohols, fumes, water or abrasive slurries, the G.T.M.—Goodyear Technical Man—can show you how to improve production and lower costs with PLIOWELD linings and coverings. He also can give you interesting information on rubber covered rolls. For details, see the G.T.M. or write: Goodyear, Industrial Products Division, Akron 16, Ohio

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER

Pliowald—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

fatigue cracks

by William M. Coffey

Le Grand Tour

The distinguished fellow on the left of this picture is Jay J. Martin, vice-president in charge of operations for Colorado Fuel & Iron Corp. The other fellow is Tom Campbell, editor of THE IRON AGE.

They are chatting at a luncheon meeting in Pueblo, Colo., where Tom passed the word on the general outlook for steel and industry. This was one of Tom's stops in an 11 state tour in the West Coast and Rocky Mountain area to survey business conditions (a check-up and sequel to our now-famous special issue *Salute to the West* which you remember from last Nov. 25). Tom's summary on this *very same subject* of western conditions appeared in last week's issue, May 19, page 74.

. . . we have an idea what these two are laughing at. Tom's probably passing on to Mr. Martin a joke he stole (as we get it) from Gerry Sabin, advertising manager of CF&I. It goes like this, in letter form:

Dear Dr. Adams, Psychologist:

I have a problem. I have two brothers. One brother is a steel peddler. The other was just sentenced to die in the electric chair for murder. My mother died of insanity when I was 3 years old. My two sisters are just no good (because of our family readership, we say "just no good"—Ed.), and my father sells narcotics.

Recently I met a girl who was just released from a reformatory where she served time for possession of a "hot" Cadillac, and I want to marry her.

My problem is: If I marry the girl, should I tell her about my brother who is a steel peddler?

Puzzled

Old Puzzlers

We promise on our word as an Acting Corporal that we will catch up on past answers next week.

Leading Aircraft

Manufacturers

use

RED METALS CO. SEAL

aluminum tooling plate

DOUGLAS · NORTHROP · NAA · LOCKHEED · BOEING · CONVAIR

Investigate . . .

The advantages of low cost Red Seal Plates and Bars for your tooling requirements. Call or write for this new Red Seal Aluminum Products Brochure.

RED SEAL METALS CO.
10035 BURTIS STREET *Dept. B*
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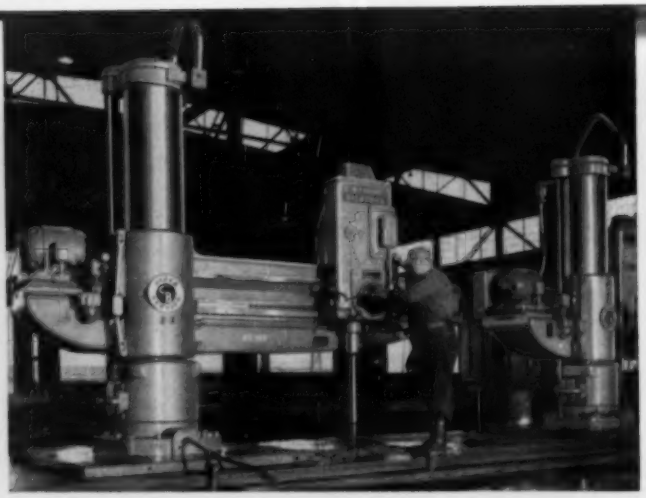
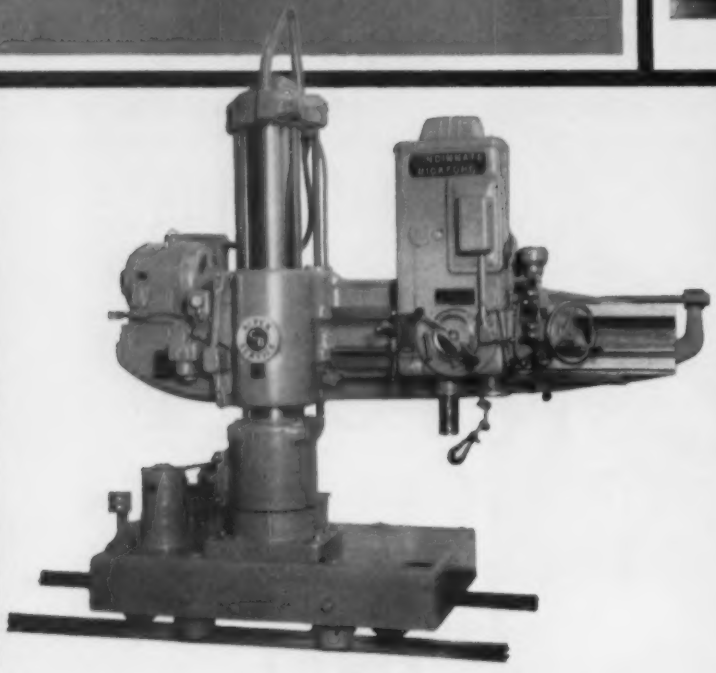
MOVES that save you money



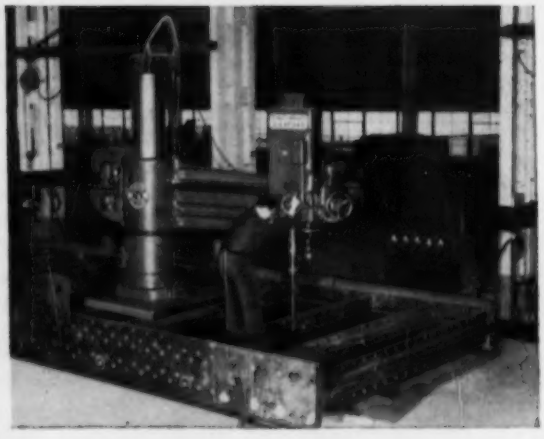


...on the large job!

These portable Cincinnati Bickford Super Service Radial Drills are effecting very large savings, up to 75% on work shown here. It is faster, more accurate and costs less to move the machine, instead of moving the work. Equipped with lifting bail, these machines are so perfectly proportioned and balanced that they need no clamping to work or floor. They do not tip or rise up while drilling.

Inquire about these portable machines—track type, sliding saddle on bed, or merely with stub base and lifting bail—they can save time and dollars for you.

Write for Bulletin R-29.



80 YEARS OF SERVICE

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

dates to remember

JUNE

ELECTRIC METAL MAKERS GUILD, INC.—23rd annual meeting, June 2-4, Hotel Fort Shelby, Detroit, Mich.

AMERICAN GEAR MANUFACTURERS ASSN.—Annual meeting, June 5-8, The Homestead, Hot Springs, Va. Association headquarters are at One Thomas Circle, Washington, D. C.

GENERAL ELECTRIC COMPANY—3rd annual Welding Show, June 8-10, Municipal Auditorium, Kansas City.

EXPOSITIONS

NATIONAL ASSN. OF PURCHASING AGENTS—Annual convention and inform-A-Show, May 29-June 1, Waldorf-Astoria Hotel, New York. Association headquarters are at 11 Park Place, New York.

BASIC MATERIALS EXPOSITION—May 31-June 3, Convention Hall, Philadelphia. Show management: Clapp & Poliak, Inc., 341 Madison Ave., New York.

MATERIAL HANDLING INSTITUTE—June 5-8, Public Auditorium and Exhibit Halls, Cleveland.

AMERICAN ELECTROPLATERS' ASSN.—42nd annual exposition, June 20-23, Cleveland Public Auditorium, Cleveland.

AMERICAN WELDING SOCIETY, INC.—Spring meeting, June 7-10, Hotel Muehlebach, Kansas City. Society headquarters are at 33 W. 39th St., New York.

SOCIETY OF AUTOMOTIVE ENGINEERS—Golden anniversary summer meeting, June 12-17, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 29 W. 39th St., New York.

EDISON ELECTRIC INSTITUTE—Annual meeting, June 13-16, Los Angeles. Institute headquarters are at 420 Lexington Ave., New York.

RADIO - ELECTRONICS - TELEVISION MANUFACTURERS ASSN. — Annual convention, June 14-16, Palmer House, Chicago. Association headquarters are at 777 Fourteenth St., N. W., Washington, D. C.

INTERNATIONAL CONFERENCE ON COMBUSTION — June 15-17, Kresge Auditorium Building, Cambridge, Mass.

AMERICAN SOCIETY OF TRAINING DIRECTORS—11th annual conference, June 15-17, Los Angeles.

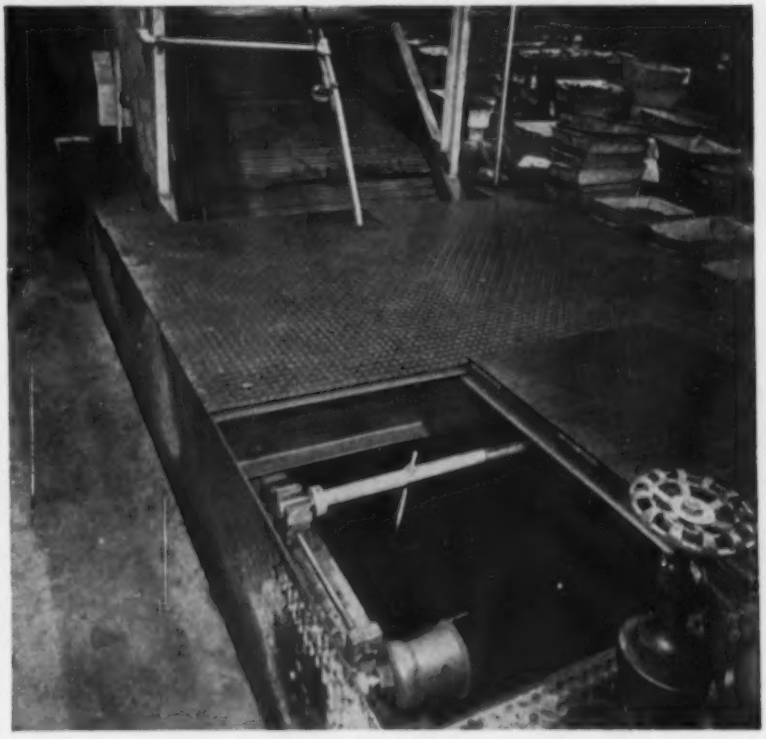
MALLEABLE FOUNDERS' SOCIETY—Annual meeting, June 16-18, The Greenbrier Hotel, White Sulphur Springs, W. Va. Society headquarters are at Union Commerce Bldg., Cleveland.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—19th annual applied mechanics conference, June 16-18, on the campus of Rensselaer Polytechnic Institute, Troy, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Diamond Jubilee semi-annual meeting, June 19-23, Statler Hotel, Boston. Society headquarters are at 29 W. 39th St., New York.

AMERICAN ELECTROPLATERS' SOCIETY—42nd annual convention, Cleveland Public Auditorium, Cleveland, June 20-23.

HOT SPOT IN HARTFORD!



1575 GALLONS OF OIL NEAR A 1700° FURNACE!

A king-size oil quench is a bad enough fire hazard by itself. Put it next to a roaring, 1700 degree hardening furnace, and it could turn a plant into a cinder pile!

So the Allen Manufacturing Company discovered when they installed this hardening and tempering machine in their Hartford, Connecticut plant!

From the hardening furnace, hex-socket screws are quenched in oil, tempered, then quenched again. A flash fire in the huge oil quenching bath could mean loss of the machine, costly down time—and possible loss of the entire plant!

Safety-minded Allen executives naturally took proper precautions, held the oil far below its flash point with thermostatic temperature controls. Still, they realized that more protection was needed! So Allen called on Kidde—long-time specialists in fire extinguishing systems.

Kidde engineers studied the problem, installed a special carbon dioxide extinguishing system which could be triggered instantly.

If fire strikes, one pull on a control handle pours clouds of fire-killing CO_2 over the blaze, snuffing flames in seconds. At the same time, pressure-operated switches in the lines automatically shut down feed and conveyor motors!

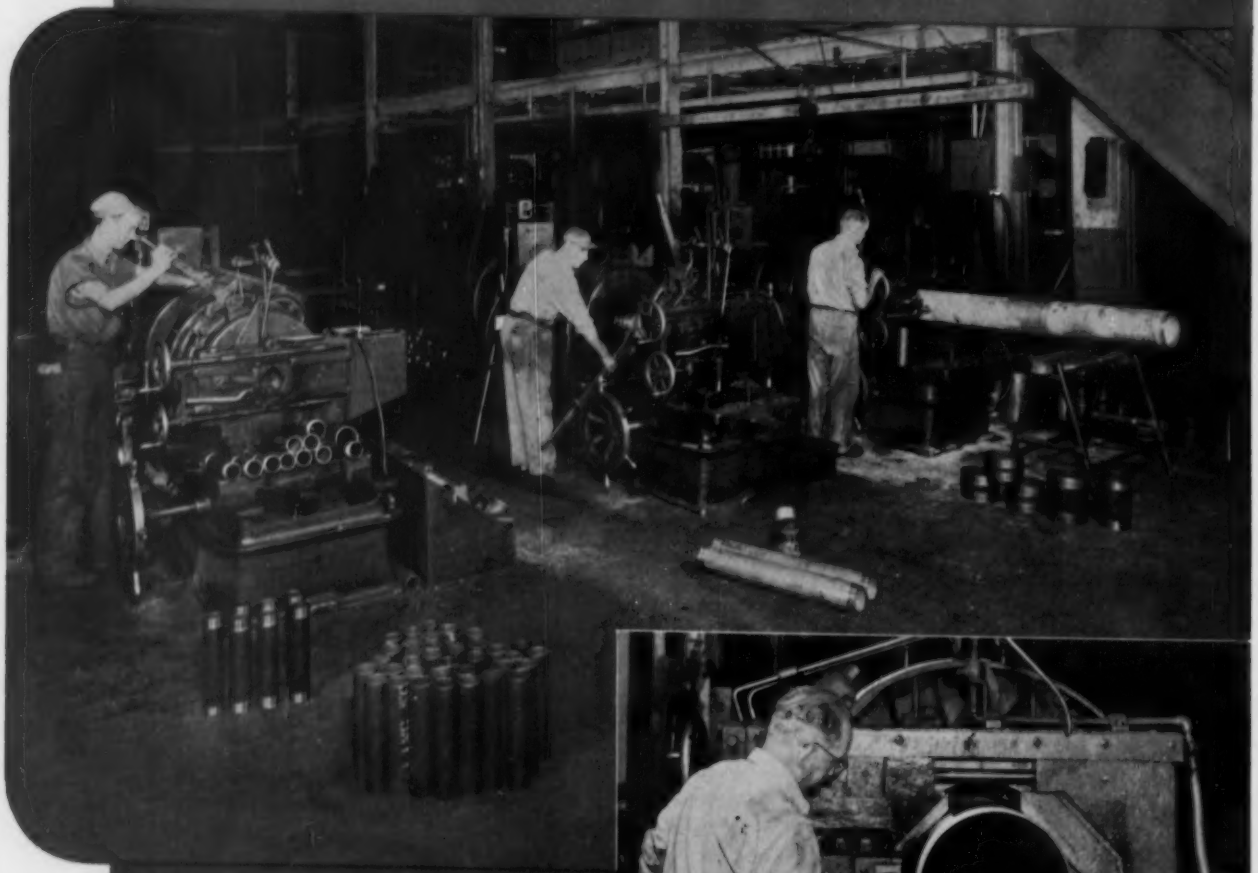
All fire hazards—dip tanks, flammable liquids and electrical equipment—are potential plant-wreckers. Make sure they get the *proven* protection of Kidde extinguishing equipment. Call your Kidde agent today!

Kidde (K Kidde)

Walter Kidde & Company, Inc.
549 Main Street, Belleville, 9, N. J.
Walter Kidde & Company of Canada, Ltd., Montreal—Toronto

The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

LANDIS PIPE ...Four



LANDIS

LANDIS Machine

. . . THE WORLD'S LARGEST EXCLUSIVE

THREADING MACHINES

Major Features Increase Efficiency

1. WIDE RANGE

Just three LANDIS Pipe Machines (2", 8" and 18") will thread all diameters of pipe from ½" to 18". Each machine is constructed so as to handle a wide range of pipe sizes—for example, the 6" machine will thread all diameters from 1" to 6". Universal size adjustment allows quick set-up.

2. DIE HEAD EFFICIENCY

The design of Stationary heads provides maximum rigidity on all diameters within their range. Positive locking action is assured through a self-locking toggle joint. Size adjustment is quickly and easily obtained through use of a single locking nut.

3. LOW TOOL COST

Chasers operate at a tangent to the work. Line contact at cutting edge reduces friction. Permanent throat assures even chip distribution. Variable rake affords proper cutting edge for different materials. Landis chasers are useable for 80% of their original length. They are individually replaceable and, within the range of a given die head, a single set of Landis chasers can be used for all diameters of the same pitch, form and taper.

4. PRECISION TAPERED THREADS

The Receding Chaser Pipe Machines are especially designed to cut tapered threads to meet A.P.I. requirements. Chasers recede into the die head at a rate equal to the taper of the thread, ensuring accurate and uniform taper along the full thread length.

COMPANY • WAYNESBORO PENNSYLVANIA

MANUFACTURERS OF THREAD GENERATING EQUIPMENT

"There's a really dependable supplier for you!"

THIS compact organization here at Bristol Brass, composed of responsible men who have *both* mill and sales experience, is known for being "fast on its feet" . . . often gets an order on the road while it would still be paperwork in a larger outfit.

Try it out for yourself. Call Bristol, Connecticut, Ludlow 3-9246 (or your nearest Bristol distributor) and ask for the Sales Department. The first man you talk to will be *your* man from there on in. For he has as much authority and capability as though he were a V.P. (which he might be, at that). As to the quality and uniformity of Bristol Brass strip, rod and wire, our customers take that for granted. *And after your second order, you will too.*

THE BRISTOL BRASS CORPORATION has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

And now . . . BRASS FORGINGS, too . . .
The Bristol Brass Corporation announces the acquisition of Accurate Brass Company, 73rd Ave. & 88th St., Brooklyn 27, New York.
"How do you know it can't be forged?"

"Bristol-Fashion" means **Brass at its Best**

The entire shell of the bucket on this 50-cu. yd. power shovel is fabricated from ¾" and 6½" "T-1" Steel Plate. Liner plates are made of ½" "T-1" Steel. "T-1" Steel Plate only 6½" thick has replaced large castings a foot thick in the lip of the bucket. Lighter weight construction with "T-1" Steel made it possible to increase the cubic capacity of the bucket by ten yards.

How USS "T-1" STEEL in big machines

cuts weight, cuts cost, increases service life

Hanna Coal Company just can't afford to have this giant 50-cu. yd. shovel break down. This machine can move 2,280,000 tons of material a month, and it must operate continuously—24 hours a day, 7 days a week—to pay off.

Strong, weldable "T-1" Steel has improved the performance of this incredibly rugged machine, and it also has cut cost and weight. It enables the designers to use *fabricated* parts in place of larger, heavier, more expensive castings. And these lower-cost fabricated parts actually *last longer* than castings. As a result, Hanna Coal Company has standardized on "T-1" Steel for the vital parts of much of its heaviest-duty equipment.

Write for complete information on new USS "T-1" Steel. It has application in pressure vessels, rotating machinery, structural steel towers, steel mill equipment, big trucks, mine cars, and elsewhere.

WHAT'S "T-1" GOT?

AT HIGH TEMPERATURES. "T-1" has good creep rupture strength up to 900° F. and is being used with great success in heavy-duty, high temperature applications.

AT LOW TEMPERATURES. "T-1" is amazingly tough at temperatures far below zero . . . has withstood impacts of 2,000,000 ft. lbs. at 38 degrees below zero.

IN FABRICATION. "T-1" can be welded or flame cut without pre- or post-heating . . . and the welds develop the full 90,000 psi yield strength.

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T" CONSTRUCTIONAL ALLOY STEEL

USS

5-475

UNITED STATES STEEL

"Forgings stay straight as an arrow in these furnaces"

says
Clair J. Koehler,
U. S. Steel Heater

OUR HOMESTEAD FORGINGS DIVISION has the most modern heat treating facilities available to accommodate the most critical forging specifications.

These vertical furnaces, for example.

These furnaces permit the ultimate in temperature control and completely eliminate any possibility of distortion even when heating forgings, such as the turbine rotor shown, to temperatures as high as 1830°F!

Why did we install these furnaces?

Clair Koehler, a heater for 15 of his 31 years with us, can answer. "Large shafts stay straight as an arrow in these verticals. We get better temperature control, too. Total temperature variation is less than 10°F. from top to bottom."

Such laboratory-type precautions are typical of the care all forgings receive at United States Steel.

Address inquiries or requests for our free 32-page booklet on USS Quality Forgings to United States Steel, Room 4727, 525 William Penn Place, Pittsburgh 30, Pa.

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL

USS

Quality FORGINGS

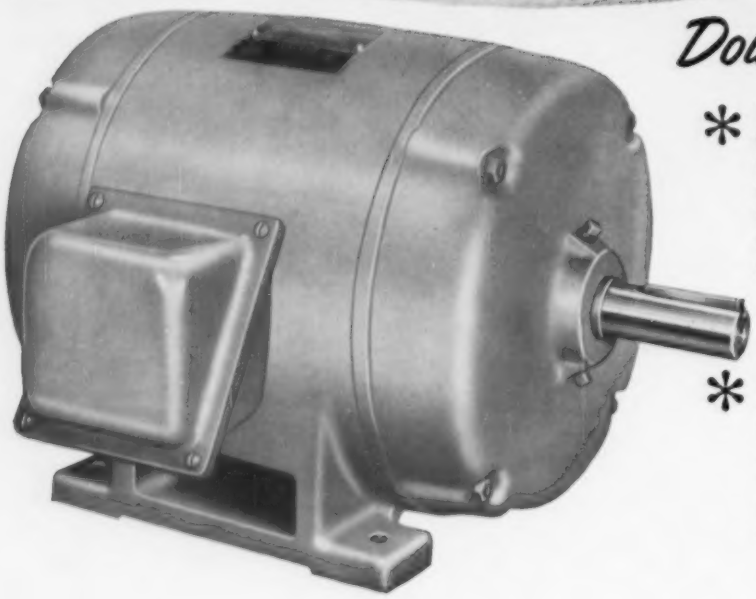
- heavy machinery parts—carbon, alloy, stainless
- forged steel rolls and back-up roll sleeves
- electrical and water wheel shafts
- hammer bases and columns

Wagner®
ELECTRIC MOTORS
...the choice of leaders in industry

NEW!

Wagner Type DP* Motors

Doubly Protected



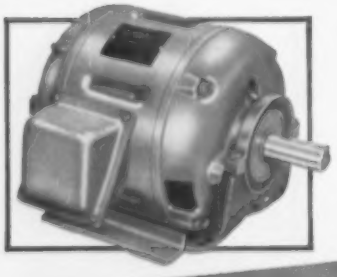
* Wagner Type DP Motors are protected by rugged, corrosion-resistant cast iron frames, smoothly rounded so that no moisture can collect on them. Motor feet are cast as an integral part of the frame for maximum strength and rigidity.

* Enclosures are drip-proof plus! Air intakes are located at the bottom of the endplates — air outlets are located at the base of the frame, one on each side. Specially designed baffles provide protection for the stator windings.

The Wagner line of polyphase, drip-proof general purpose motors—rerated to the new NEMA Standards—pack more power into smaller frames, but give you the same high Wagner Quality and long life performance that have made Wagner Motors "the choice of leaders in industry" for many, many years. These new Wagner Motors are fully protected in the ball bearing models. Their construction makes them completely drip-proof — and virtually splash-proof. The extra large, diagonally split conduit box makes wiring easy. Smaller size and lighter weight means more economical handling and installation.

These new rerated Wagner Motors retain the features desired by plant engineers and maintenance men. They will operate for years without regreasing. But . . . when lubrication *is* necessary or desirable, you *can* lubricate these motors because they are provided with two lubrication openings.

Bulletin MU-202 gives full information—write for your copy today.



AVAILABLE WITH RESILIENT MOUNTING —SLEEVE BEARINGS UP THROUGH 5 HP.

These Wagner standard motors, in ratings up through 5 horsepower, can be used for specialized applications because they are available in sleeve bearing models with endplates that will take resilient mounts.

You can look to Wagner for a complete line of standard motors for specialized applications. The wide range of types and sizes permit the selection of a standard motor for almost any need.

Wagner Electric Corporation EST. 1891

Wagner Electric Corporation
6403 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

M5914

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS–AIR AND HYDRAULIC

PUT AIR AT YOUR FINGERTIPS

Button Type—forged brass body; variety of interchangeable noses; easy grip—parts easily maintained.

Lever Type—forged brass body; air controlled from a puff to a breeze; hang-up arrangement; steel lever; comfortable grip; interchangeable noses—easily maintained.

Drop forged Stainless Steel—withstands hard use; shielded operating button; comfortable grip; countersunk nose; protective hand guard doubles as hang-up hook—parts easily replaced.

Use Schrader blow guns . . . 36 designs and styles

Schrader Blow Guns are made to *fit your hand . . . fit your job!* Schrader Blow Guns are built to take it—here's why:

They're rugged both in design and construction. Bodies are drop-forged either of brass or stainless steel.

They're convenient—can be used anywhere. Blow gun circuits—using Schrader Couplers, Hose and Automatic Hose Reels—take little space, yet put compressed air right at your fingertips.

They're economical—they have few moving parts. And replacement parts, when and if needed, are easily installed.

They're versatile—with nine interchangeable noses—both fixed and adjustable—that fit all three standard-type guns, you can't think of a blow-gun application that Schrader can't meet.

It's easy to find out for yourself what a wide selection of blow guns is in the complete Schrader Line of air control equipment. Write today—or, if you prefer, fill out the coupon below.

Schrader
REG. U. S. PAT. OFF.

LEADERS IN AIR CONTROL SINCE 1844

SPECIAL ADJUSTABLE NOSES

VARIOUS STANDARD NOSES

The complete Schrader line of pneumatic accessories includes everything you need

A. SCHRADER'S SON
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I am interested in more information on_____

Name_____ Title_____

Company_____

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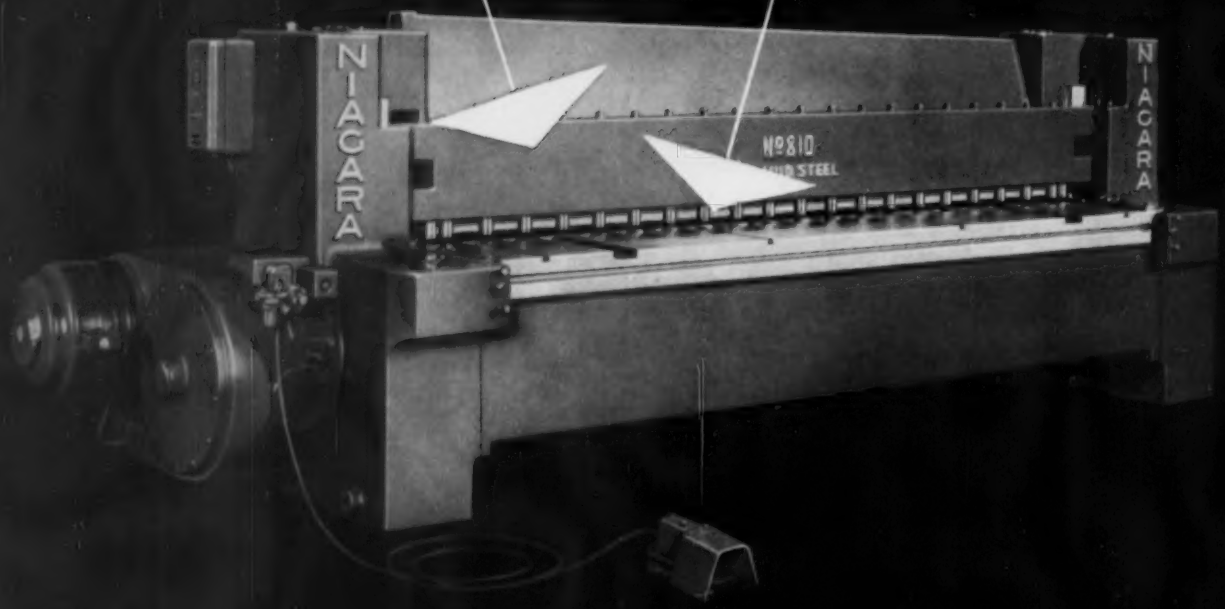
SELF-COMPENSATING HOLDDOWN



THE MACHINE TOOL SHOW

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

a BIG FACTOR in the superiority of Niagara Shears

"STRAIGHT-EDGE" CUTTING ACCURACY
Positive, power actuation grips work securely for maximum cutting accuracy.

LOW IMPACT AVERTS DAMAGE AND INACCURACY
Individual pressure feet contact work with low impact, thus safeguarding both the material and bed against damage, as well as reducing noise level. No hammer-blows to mar work. No peening of bed with resulting distortion of knife seat.

SIMPLIFIED, LOW UPKEEP DESIGN
Simplicity of design and construction, involving a minimum number of parts, assures negligible servicing. With *less* to go wrong, there is *less* to repair and replace.

HOLDS WORK FLAT AND STATIONARY
Multiple pressure feet on 6" centers, applying uniform pressure, hold work flat and tight against bed to assure utmost shearing accuracy. No rippling of sheet between feet as cut progresses. Firm grip on short pieces.

HANDLES STOCK OF VARYING THICKNESS
Individual feet are self-compensating, requiring no adjustment for cutting stock of different thicknesses . . . *even at the same time.*

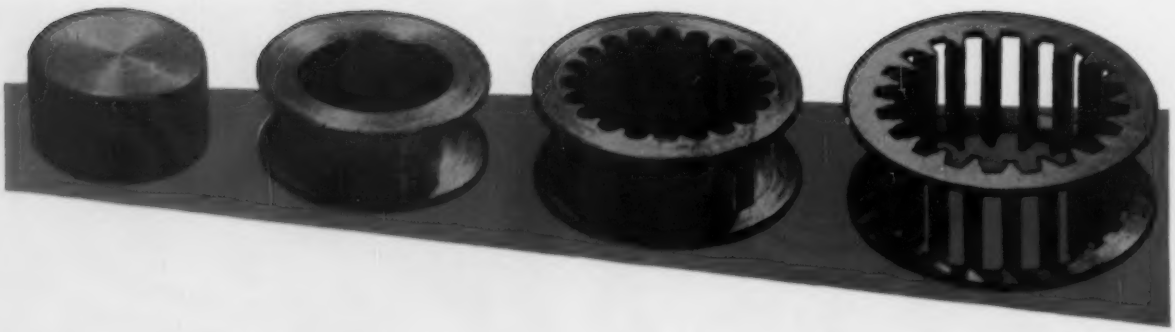
NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.
DISTRICT OFFICES: Detroit • Cleveland • New York • Philadelphia
Dealers in principal U. S. cities and major foreign countries

In a power squaring shear, no *single* feature nor component can be fully responsible for accuracy, speed and economy. *They* result from a *combination* of features such as the self-compensating holddown; rigid, fully closed box section construction of bed and crosshead; low slope of upper knife; ample and accurately held crosshead guides; multiple point sleeve clutch —the very features that have established the marked superiority of Niagara's Underdrive Series.

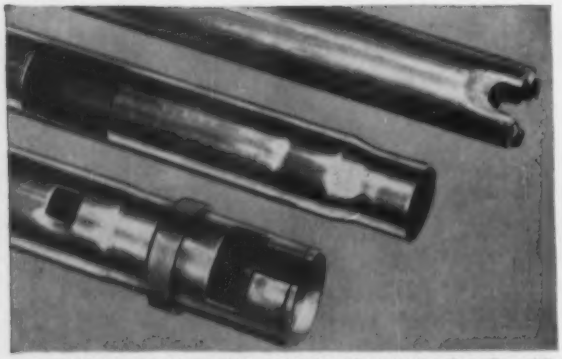
For the whole story, straightforwardly presented, on America's most complete line of underdrive power squaring shears, with capacities from shim stock to 1 in. thick mild steel (lengths 3 to 20 ft.), request *Niagara Bulletin 69*. Write today.

NIAGARA

UNDERDRIVE SQUARING SHEARS



Republic Alloy Steels help Johnson make dependable



YOU CAN SAVE ON TUBULAR PARTS LIKE THESE when Republic does the tube fabricating. Republic's Steel and Tubes Division is equipped to handle all kinds of tough fabricating jobs—has the machinery, the experience and the ability to work out the most economical method of making quality tubular parts. And that includes complete assemblies.

SAVE UP TO 66% OF YOUR STORAGE SPACE with Republic Collapsible Boxes. This PB-127 unit solves the problem of storing and shipping emtpy boxes. It's designed for heavy-duty service. Can be tiered when loaded or empty—collapsed or set up. It is a one-piece unit. Pin and slide belt arrangement assures positive locking.

REPUBLIC STEEL CORPORATION
3104 East 45th Street
Cleveland 27, Ohio

REPUBLIC STEEL

Please send more information on:

☐ Cold Drawn Alloy Bars ☐ Boxes and Skids
☐ Mechanical Tubing ☐ Free-Machining ENDURO®

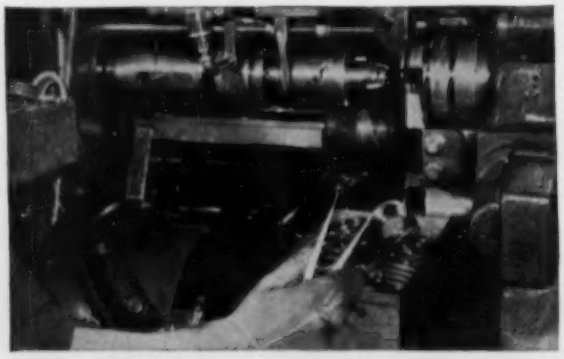
Name_____ Title_____

Company_____

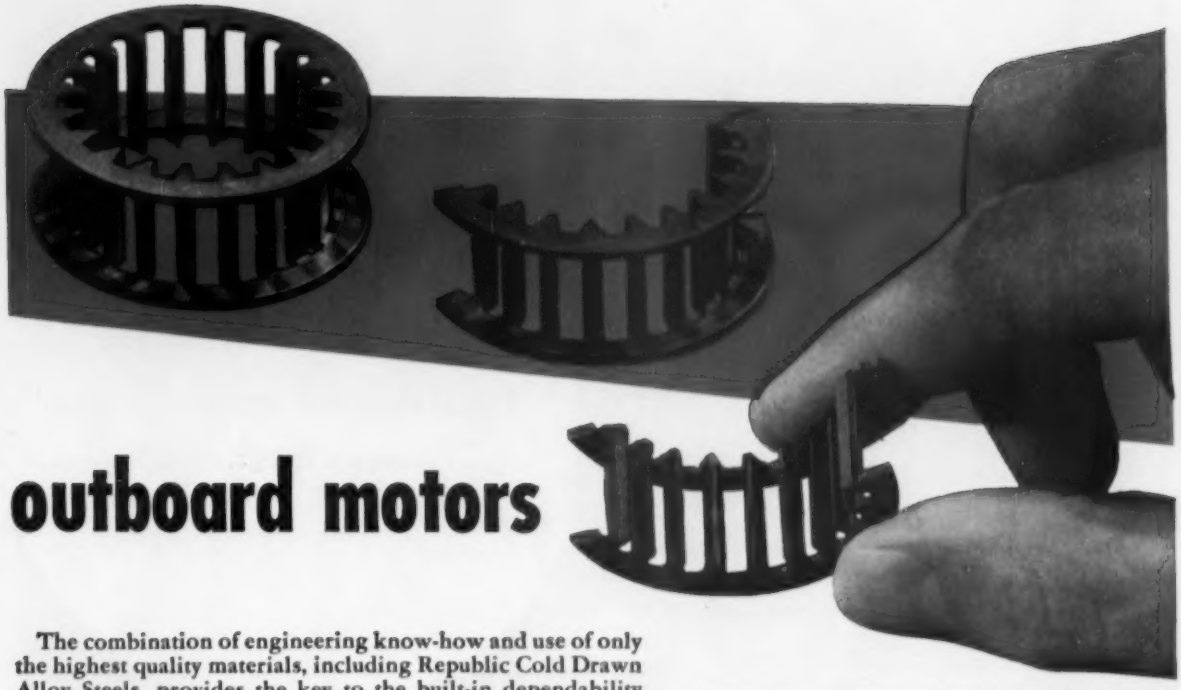
Address_____

City_____ Zone____ State_____

R-4070



GIVE YOUR DUPLICATE PARTS THE HIGH MECHANICAL and corrosion-resisting properties of stainless steel. Do it without a heavy production penalty. Simply set up and run Free-Machining ENDURO Stainless Steel Bars. Two grades are fully 90% as machinable as Bessemer screw stock. These high-quality, cold drawn bars provide close tolerance, accuracy of section, uniform soundness, a fine surface finish. Available in hot-rolled bars as well as cold finished bars and wire.



outboard motors

The combination of engineering know-how and use of only the highest quality materials, including Republic Cold Drawn Alloy Steels, provides the key to the built-in dependability of Johnson Sea-Horse Motors.

Highly machined parts, such as the connecting rod bearing retainer shown above and the spiral bevel gears that drive the propeller shaft and other parts, are made from Republic Cold Drawn Alloy Steels.

As in many new product developments, certain difficulties were encountered in the initial stages of production. The bearing retainer, considered to be one of the most difficult parts in existence to machine, is a case in point.

During rough broaching, chips welded to the broach and tearing of the metal occurred on bearing pockets. A Republic Field Service Specialist was invited to work on this problem with Johnson Engineers. A solution was worked out through close cooperation and teamwork. The blanked parts were heat-treated to increase Brinell hardness. Broaching improved immediately. Chip adherence was eliminated. Surfaces were much smoother.

Republic supplies Johnson with cold drawn alloy steel bars for better machinability, longer tool life and the fine finish needed for parts on their new line of quiet motors.

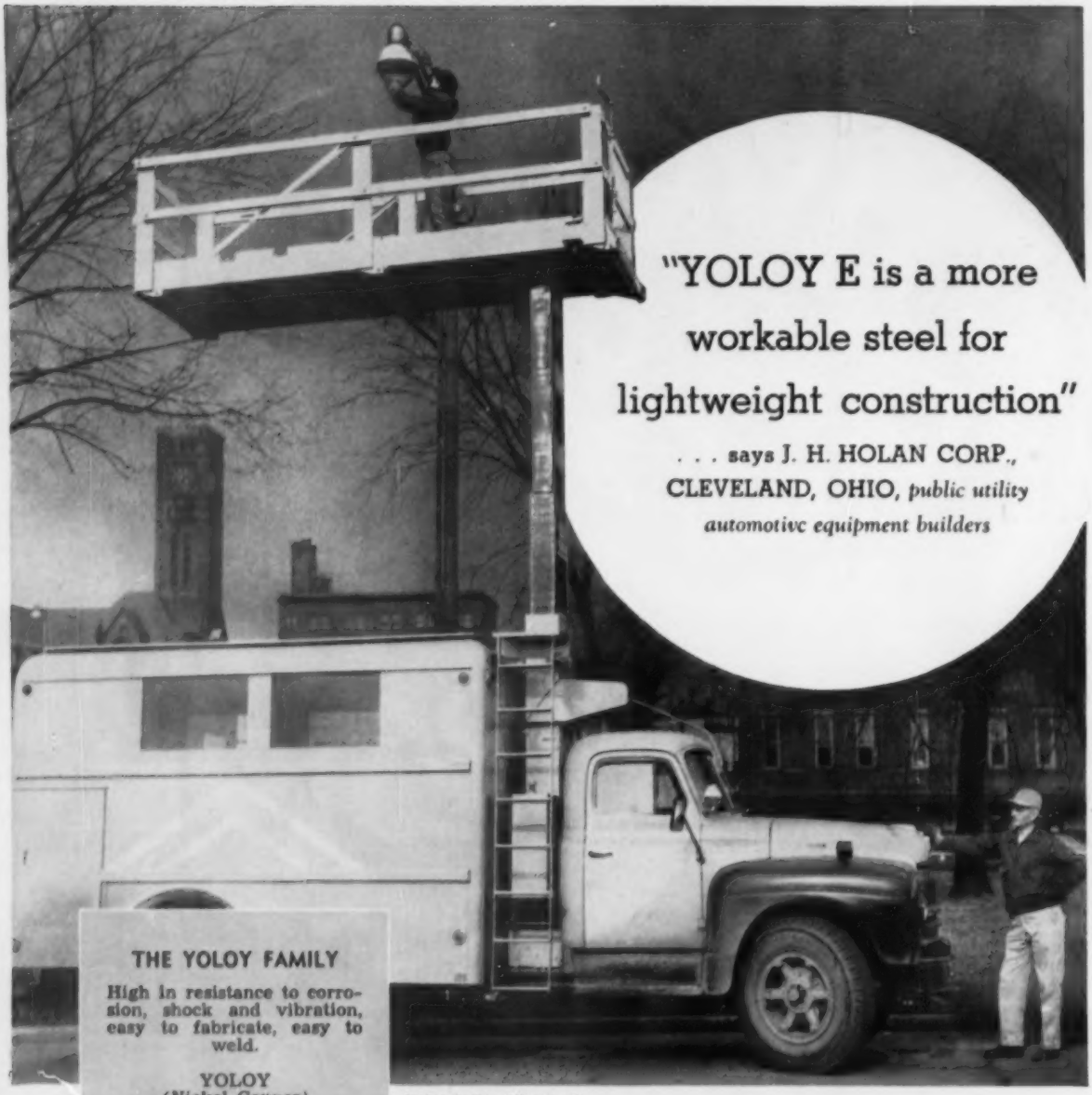
You can put these qualities of Republic Cold Drawn Alloy Bars to work in your steel parts—plus high strength, close tolerance, toughness, hardenability, accuracy of section. And Republic metallurgists and machining specialists stand ready to help you uncover the answers to tough cost and production problems, ready to help you get the most out of the Republic Cold Drawn Alloy Bars you buy. The coupon will bring you more information.

Gear action on Johnson Motors is smooth, positive, quiet. Photo illustrates sequence of machining operations performed on the spiral bevel gears that drive the propeller shaft. Republic Cold Drawn Alloy Steels give these parts added strength and a fine surface finish.

REPUBLIC STEEL

World's Widest Range

of Standard Steels and Steel Products



"YOLOY E is a more workable steel for lightweight construction"

. . . says J. H. HOLAN CORP., CLEVELAND, OHIO, *public utility automotive equipment builders*

Holan-built utility truck body fabricated from Yoloy E steel.

THE YOLOY FAMILY

High in resistance to corrosion, shock and vibration, easy to fabricate, easy to weld.

YOLOY
(Nickel-Copper)
Low Alloy High Strength Steel

YOLOY E
(Nickel-Chrome-Copper)
Low Alloy High Strength Steel

YOLOY C
(Chrome-Copper)
Corrosion Resistant Steel

QUALITY YOUNGSTOWN SERVICE

● This utility body builder finds Yoloy E—Youngstown's low-alloy high-strength steel—an important time-and-money saver and product improver.

They report that Yoloy E is an easily "workable" steel. Once brake dies are set, there is remarkably little breakage and scrap.

Truck users also benefit. The high strength of Yoloy E permits the use of lighter gauge in bodies and equipment, providing reduced weight and increased payload. The exceptional rust-and-corrosion-resistance lengthens equipment life, reduces maintenance.

For information about Yoloy steels, write our nearest District Sales Office.

Youngstown

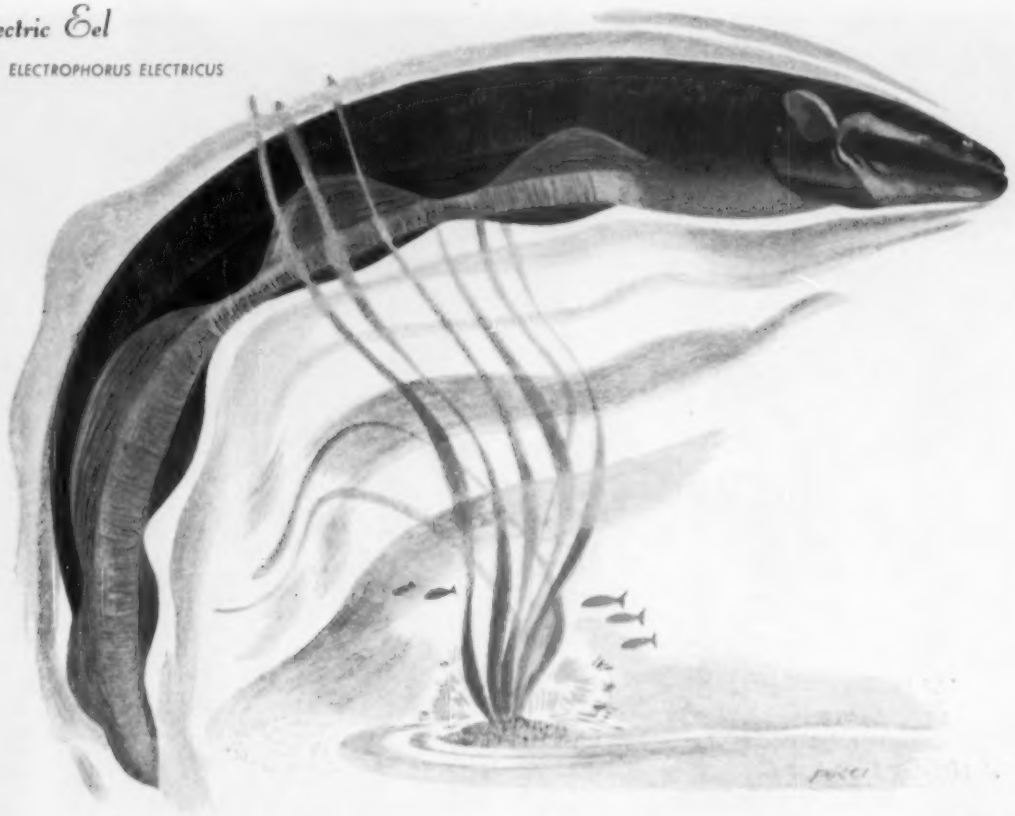
THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Electric Eel

ELECTROPHORUS ELECTRICUS



Electrical Conductivity

Nature has endowed the Electric Eel with the ability to generate and conduct electricity. Under tests, this creature has discharged as much as 550 volts, and 1 ampere of current. That's enough to kill a man.

The shock of an Electric Eel is effective for a radius of more than 20 feet. The eel eats fish, frogs and worms which it kills or paralyzes by its electrical discharge.

Aluminum has been endowed by nature with electrical conductivity which is superior to that of most other metals.

Comparing aluminum wire and copper wire of equal electrical resistance, the aluminum wire can carry 112 per cent of the current carried by the copper wire, and the aluminum wire will weigh only half as much. On a volume basis aluminum conductors have about 61 per cent of the conductivity of copper.

Other properties of aluminum of interest to the electrical fabricating industry are: high corrosion-resistance, lower costs of assembly, installation and maintenance.

Aluminium Limited Sales, Inc. is the distributor in the United States for aluminum from Canada. Why not investigate making your products of aluminum?

Electrical Conductivity

Besides being used for high-tension transmission lines and distribution line conductors, aluminum serves the electrical industry in many ways. For instance, it is used in Railroad Electrification, Bus-bars and Fittings, Motor Rotors and Windings, Electric Lamp Bases and Sockets. Aluminum is being used, in the fabrication of electrical items, all the way from the turbine to the toaster.

Aluminum *from* Canada

Aluminium Limited Sales, INC.

630 FIFTH AVENUE • NEW YORK 20, N. Y.

CLEVELAND • CHICAGO • DETROIT • LOS ANGELES • BUENOS AIRES • SÃO PAULO

Production Increased 30%

Shown here is a 6000 lb. Chambersburg Steam Drop Hammer and a No. 200 Chambersburg Steel Side Trimming Press installed in a forge shop specializing in railroad car parts, gear blanks and general job forging. A 2000 lb. hammer and a No. 100 Trimmer are also installed. Hammers operate on air.

In replacing older hammers, the Chambersburgs were selected for the accuracy and quality of their manufacture. Experience to date shows maintenance costs are lowered, rejects are fewer, less down time is required, and as a result management figures production is up 30%!

If you are interested in getting similar results in your own shop, write for a copy of Bulletin 55-L-4.

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

CHAMBERSBURG

"THE HAMMER BUILDERS"

Tube Makers Please Note —

A tube mill represents a major investment. Good business practice dictates that before you invest—you should investigate.

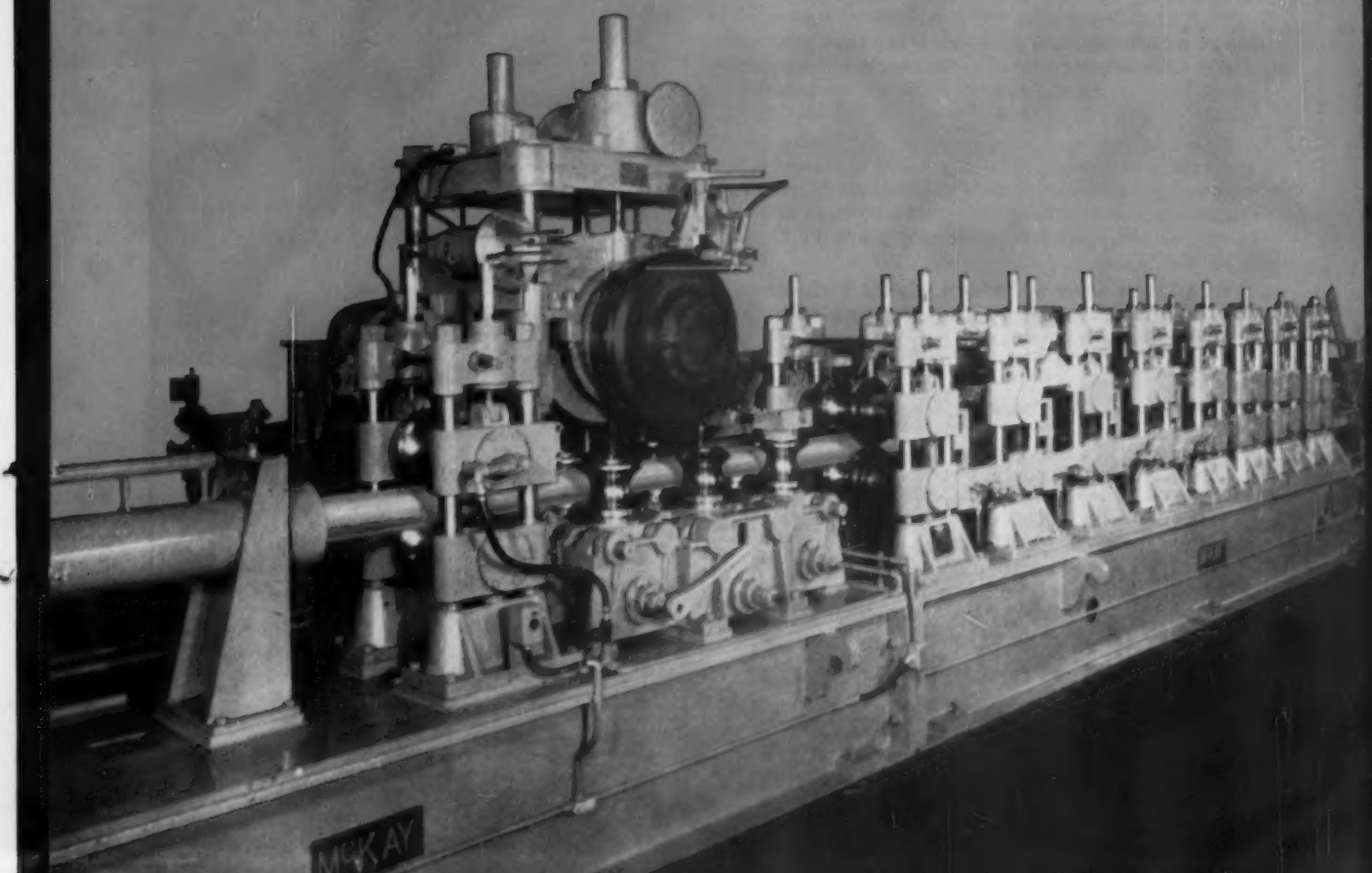
We here at McKay believe we build the finest tube mill made today. We could point to many features that support this belief. However, these features are all a part of our determination to constantly improve the product, and to *never substitute for quality.*

Experience has proved the most expensive single item in tube mill operation is *down time.* This time lost can quickly mount into thousands of dollars — making any savings in the initial cost of equipment trivial by comparison.

Every McKay Tube Mill is designed to deliver the ultimate in PERFORMANCE, PRECISION, RUGGEDNESS and SAFETY. Compare! Investigate thoroughly before you buy and we feel sure you'll specify TUBE MILLS by McKAY.

THE McKAY MACHINE COMPANY, *Youngstown, Ohio*

Designers and builders of modern tube making, forming, sizing, reducing, welding and cut-off equipment.



Get Extra Sub-hearth

SAFETY AND LONGER LIFE

with Kaiser Periclase D-S Brick

THIS superior brick has been *especially designed* to withstand sub-hearth conditions. Thus, it gives maximum protection against costly breakthroughs and provides longer sub-hearth life.

All the important properties outlined by major steel company ceramists as most desirable for sub-hearth brick are found in Kaiser Periclase D-S Brick.

High MgO (more than 95%) is achieved through the use of pre-shrunk, accurately-sized Periclase grains derived from sea-water magnesia. Absence of chrome eliminates the reduction of chromium oxide and damage to the refractory structure. (Brick contains only 0.8% Cr_2O_3.)

Low iron content minimizes refractory damage from alternate oxidation and reduction of iron oxide and other iron compounds. Absence of calcium oxide prevents damage caused by slaking during slow heat-ups or while furnace is idle. (Brick contains only 0.6% Fe_2O_3 and 1.2% CaO.)

With all its many advantages, Kaiser Periclase D-S Brick gives you the ultimate in sub-hearth safety and durability—*yet costs no more!*

Kaiser PERICLASE Brick for the Steel Industry:

- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick (PCA)
- Kaiser Chrome Periclase Brick (CPA)

Now available! A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.

Installation advice on request

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

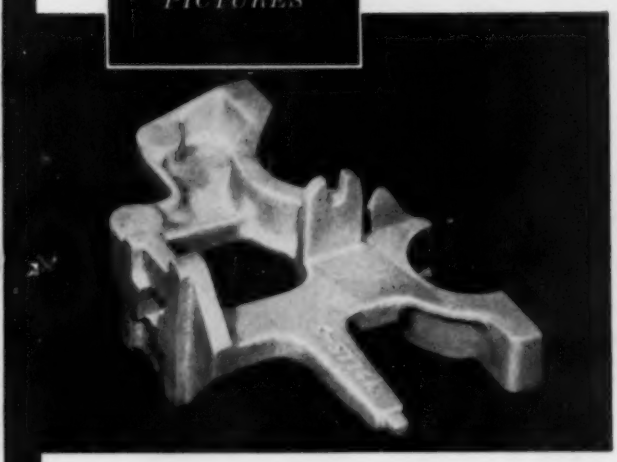
Kaiser Chemicals

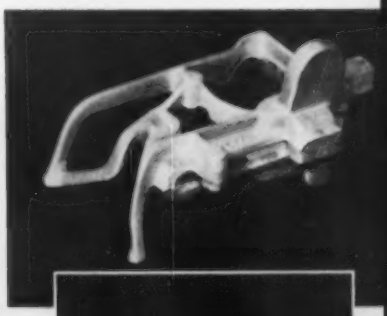
Pioneers in Modern Basic Refractories

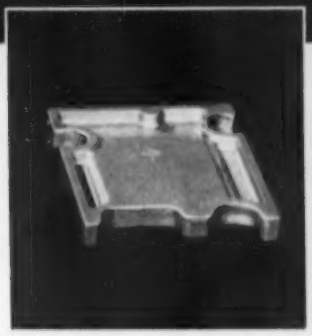
Basic Refractory Brick • Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

MONSANTO PROFIT PICTURES

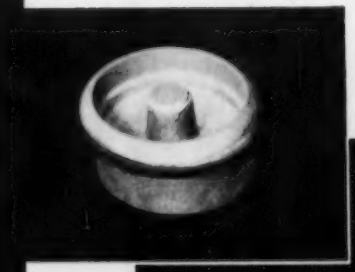
DO YOUR CASTINGS NEED COSTLY CLEAN-UP?

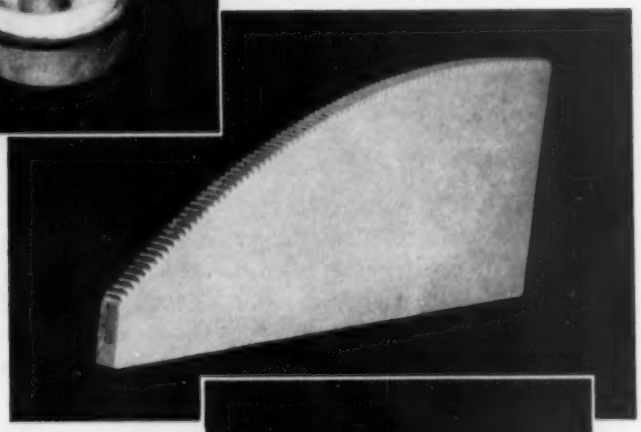






Get results like this... without finishing
...by using Resinox-bonded shell molds!





More and more foundries are discovering a way to make phenomenal savings in cleaning room costs.

By bonding shells with Monsanto's Resinox,* they are producing castings that have the highest order of surface finish.

On many jobs no finishing is required, even on intricate designs. Edges are clean and sharp—detail is perfect. Rejects are minimized.

Resinox phenolic resin sets up to form harder, stronger molds. Consistently close dimensional tolerance can be held—between 0.002 to 0.004 inches per inch for casting weights ranging from a few ounces to over 200 pounds!

On a low resin-to-sand ratio, Resinox saves valuable machine time and usually improves metal yields.

With the economy and quality of shell molding depending so much on the resin used, it pays to specify Resinox.

For shell molding, core binding or sand conditioning resins that are research-developed and shop-tested to meet *your* foundry needs, write first to Monsanto Chemical Company, Plastics Division, Springfield 2, Mass.

*RESINOX: REG. U. S. PAT. OFF.

For stronger shell molds, specify

RESINOX®

MONSANTO

ease your hydraulic equipment maintenance problems with GULF HARMONY OIL

Use a hydraulic oil that has excellent resistance to oxidation, high film strength, outstanding rust preventive and anti-foam properties—qualities which hydraulic engineers consider to be the most important when selecting a hydraulic lubricant —and you will have fewer maintenance problems and less down time.

Gulf Harmony Oil has all of these qualities. It prevents the formation of sludge deposits and maintains its original viscosity over long periods of time. It also protects hydraulic equipment against excessive wear, even under severe conditions of pressure, speed, and temperature. And it protects against the damaging effects of harmful rust.

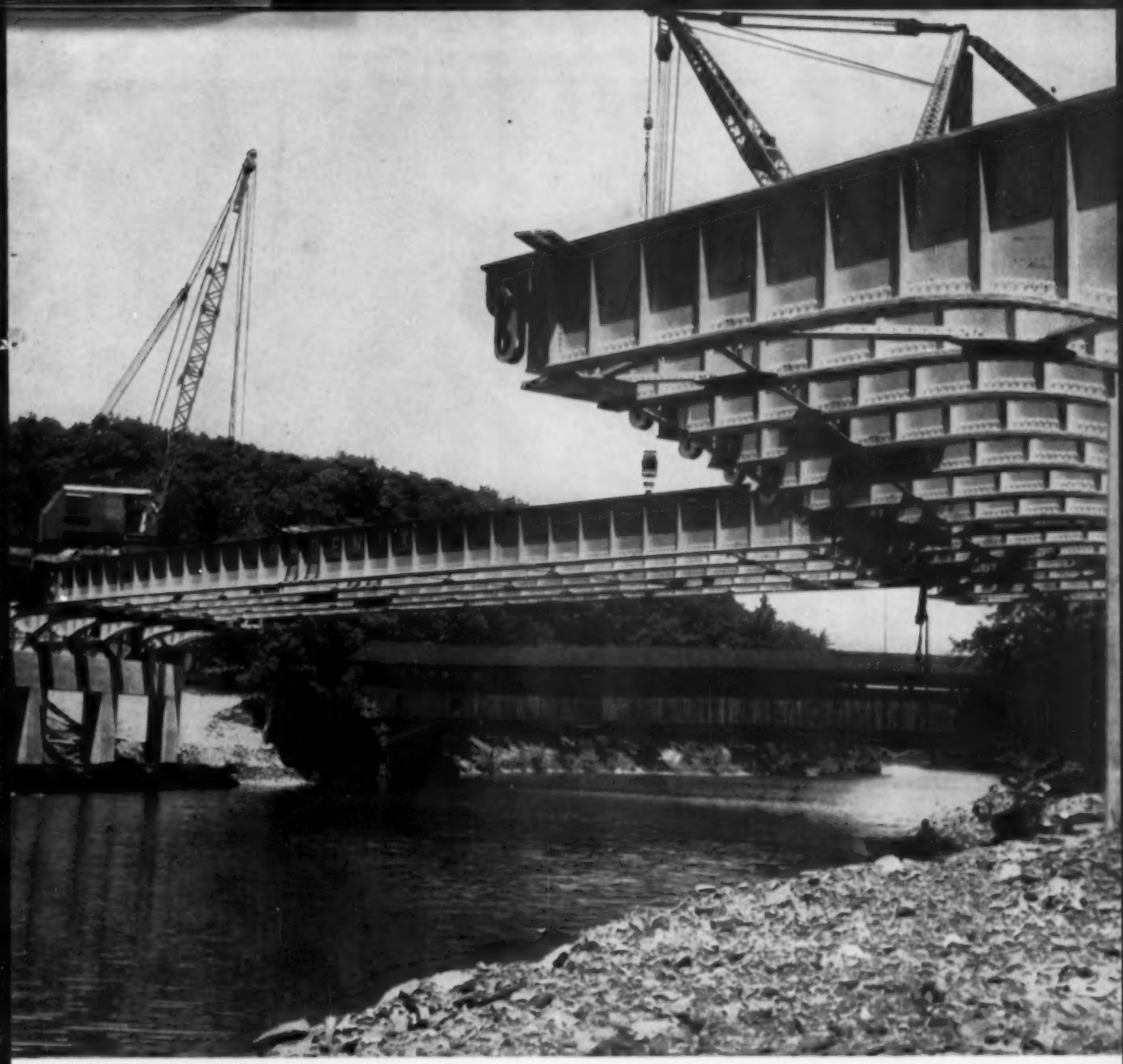
So if you have maintenance problems with your hydraulic equipment, call in a Gulf Sales Engineer. He will recommend the right grade of trouble-preventing Gulf Harmony Oil for your equipment. Contact him today at your nearest Gulf office.

GULF OIL CORPORATION
1822 Gulf Building

GULF

GULF REFINING COMPANY
Pittsburgh 30, Pa.

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS



CROSSING THE WALLKILL at New Paltz, N. Y. are the new and the old in U. S. bridge-building. Foreground: N. Y. State Thruway bridge erected by Phoenix Bridge Co. is 356 ft. long, 107 ft. wide, weighs 1778 tons. General contractor: Corbetta Construction Company, Inc. In distance is Perrine's Bridge built in 1850.

Three-handed bridge

The sign on this New York Thruway bridge says "Phoenix"—but the structure is actually the product of three Barium companies.

Steel plate came from Central Iron and Steel Company; structural members from Phoenix Iron & Steel Company; while fabrication and erection were done by Phoenix Bridge Company, live-wire veteran of 91 years in the bridge-building business. Tie that for a smooth-running, integrated operation.

Bridge-building is only one field where Barium delivers the goods faster. Reason? We can focus the resources of 16 separate companies on the job. And there aren't many jobs the Barium team isn't able to take on. Reason for *that*? Unique diversification—from asphalt barges to magnesium airplanes—plus an alert management intent on keeping Barium a step ahead of the field.

Your copy of the Barium Story, which goes behind the scenes at Barium, is waiting. Just write Barium Steel Corporation, 25 Broad St., New York 4, N.Y. 53

16 INTEGRATED COMPANIES

BARIUM

STEEL CORPORATION

WORKING IN STEEL, ALUMINUM, MAGNESIUM, FIBERGLASS

Steel Producers

Chester Blast Furnace (pig iron) • Central Iron and Steel Company • Phoenix Iron & Steel Co.

Steel Fabricators & Processors

Phoenix Bridge Co. • Industrial Forge & Steel, Inc. • Globe Forge, Incorporated • Geometric Stamping Co.

Manufacturers of End Products

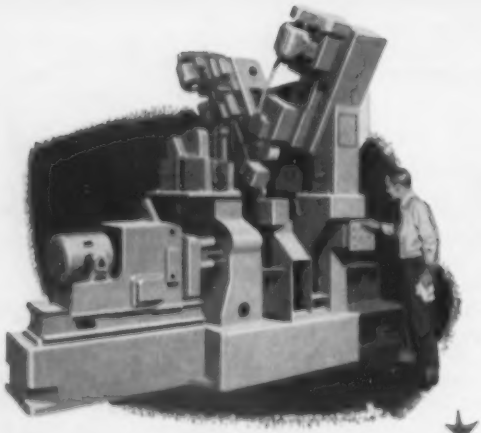
Clyde Iron Works, Inc. • Erie Bolt and Nut Company • Bayonne Bolt Corp. • Cuyahoga Spring Company • Jacobs Aircraft Engine Co. • Kermath Manufacturing Company • Kermath Limited (Canada) • Wiley Manufacturing Co.

Lightweight Metal and Plastics

East Coast Aeronautics, Inc.

For exceptional service to industry, it's

DELCO preferred



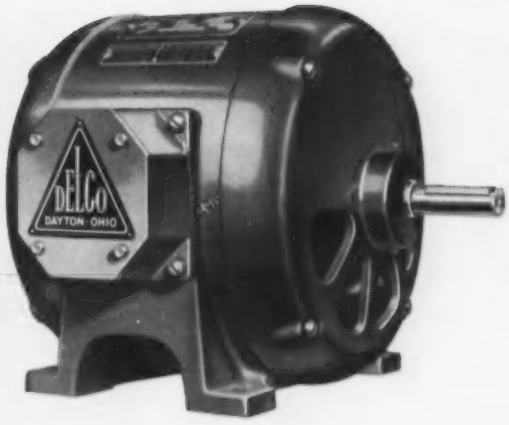
There is a Delco Electric Motor for almost every industrial need, from smallest integrals to big totally enclosed fan-cooled models.

Each Delco Electric Motor is built to rigid standards of quality, and subjected to rigorous tests throughout production.

And the noted Delco design engineering service "job fits" the right electric motor to your special industrial requirement—helps you specify the right motor for each application. Delco Products

★ *See Delco Electric Motor national advertising in The Saturday Evening Post for the story of the full Delco Electric Motor line.*

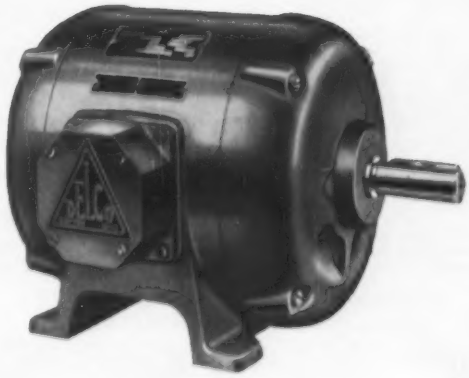
DELCO
DAYTON OHIO



engineers will work with your engineers to make certain it's right.

That's why Delco Electric Motors perform better, stand up longer, cost less to maintain. That's why in industry it's Delco Preferred . . . why Delco is best for you.

Wherever your plant is located, Delco parts and Delco service will always be available nearby. Your requests for further information will be most welcome, and will be given prompt attention.

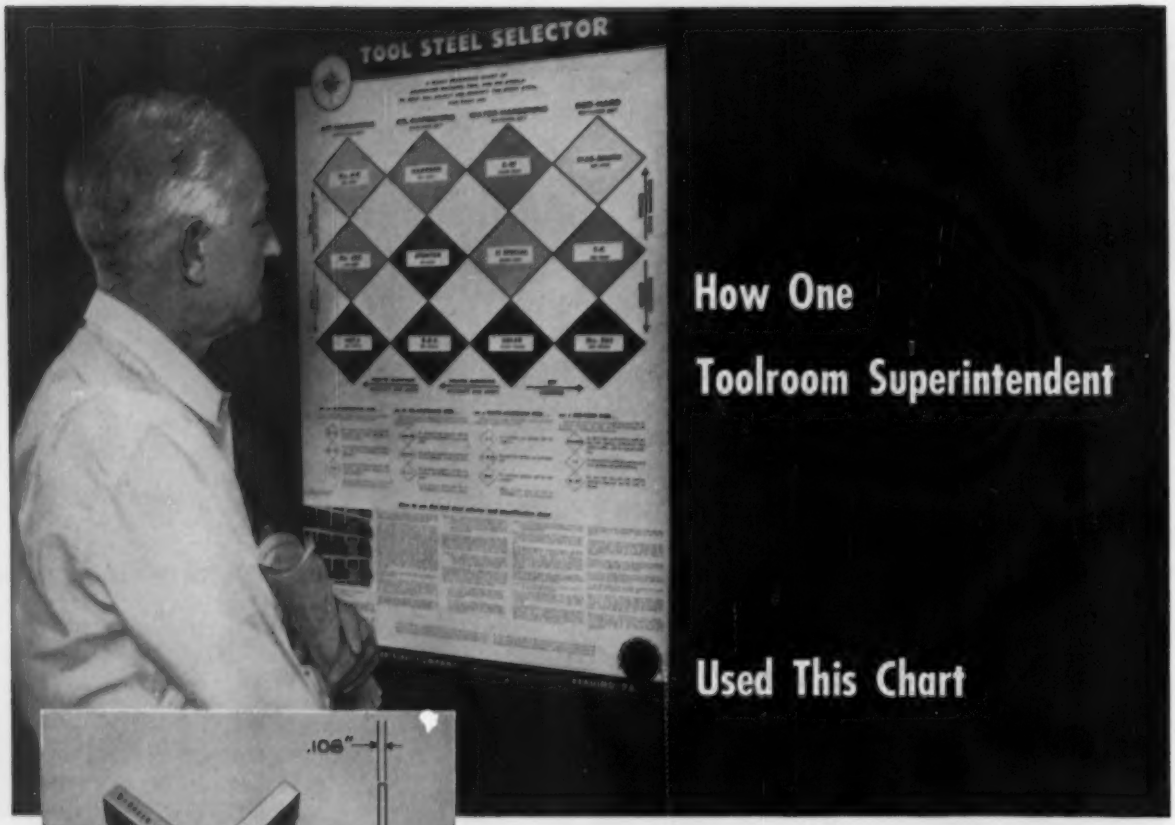


GM GENERAL MOTORS DELCO

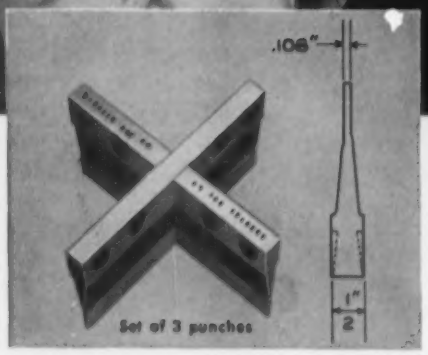
DELCO *Electric* MOTORS

DELCO PRODUCTS, DIVISION OF GENERAL MOTORS, DAYTON, OHIO

Proved best by Performance!



How One Toolroom Superintendent Used This Chart



Job: A set of three special punches used on a high speed machine to close the joints on prefabricated metal window frames made from ⅛" thick SAE 1010 steel.

Problem: Many types and grades of tool steels were tried, but all lacked the necessary toughness and hardening safety. Best service life from any before breakage was three days. Because a set of 3 punches cost hundreds of dollars to make, the low production was hiking up operating costs at a prohibitive rate.

Solution: In a final effort to find a steel with enough toughness and safety in hardening, the Toolroom Superintendent turned to Carpenter and the Matched Set Method. Carpenter R.D.S. (Oil-Tough) was indicated.

Results: Now punches stay in service for about three months, and instead of breaking, they wear out in service.

. . . To Hold Down Operating Costs

In working with many men responsible for tools and dies, we've discovered a simple but often overlooked fact: The man who approaches each tool and diemaking job with the idea of . . . *Simplifying* it, *Reducing* heat treating hazards, and *Improving* previous performance . . . is bound to do a better job.

If you or your men have that approach, Carpenter wants to be of help. We like to think of our association with customers as a "partnership" in a mutual effort to get best possible results. And here's what we offer: Practical, *workable* help at *every step* from diemaking, to heat treating, through on-the-job performance.

And that's why it works . . . both of us have a common goal. Just one example of hundreds is found in the Field Report shown to the left.

One part of this program is the Carpenter Matched Set Method. It is an accurate blueprint for selecting the *one* die steel ideally suited to give you the results you want. It is all outlined in a convenient, full-color Wall Chart available to you.

And that's only a part of the program . . . a program that involves almost 70 years' experience in the development of new and constantly-improved die steels. We're ready to work for you, now. Simply call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. THE CARPENTER STEEL CO., 121 W. Bern St., Reading, Pa.

Carpenter STEEL — Matched Tool and Die Steels

IMMEDIATE DELIVERY from local warehouse stocks

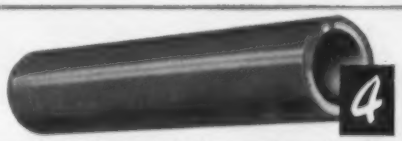
Export Department: The Carpenter Steel Co., Port Washington, N.Y.— "CARSTEELCO"

7 WAYS to SAVE MONEY with TOCCO* Induction Hardening

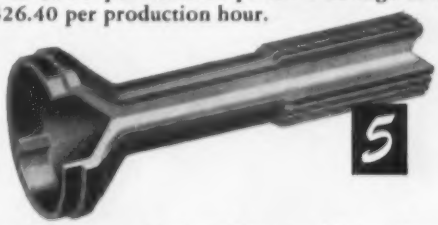
Cost was reduced 94% when heat-treatment of this corn-harvester part was changed from carburizing to TOCCO-hardening, 9½c saved on every piece — $4750 on each 50,000 piece batch, plus an hourly production increase from 120 to 300 pieces per hour.

$375 per day! When Salisbury Axle switched to TOCCO-hardening axle shafts. Less machining—30 seconds instead of 2 minutes—means lower tool cost. Also production zoomed from 50 to 120 per hour. TOCCO hardened shafts have 200% greater torsional life.

Kearney & Trecker Corp. reduced the cost of hardening this milling machine part from $1.57 to 10c apiece. In addition TOCCO made possible a switch from alloy to S.A.E. 1045 steel—saving another 11c per piece in material cost. Kearney & Trecker hardens 140 different parts on one TOCCO unit.



Thompson Products Ltd. boosted production of these automotive wrist pins from 500 to 1200 per hour when they switched to TOCCO-hardening. Costs fell from $5.45 to $3.25 per hundred parts—a savings of 2c per pin, $26.40 per production hour.



Mechanics Universal Joint Division of Borg-Warner reports a 69% savings in the hardening of stub ends for propeller shafts. TOCCO also upped production from 35 to 112 parts per hour—over three times as fast as conventional heating methods.

Lima-Hamilton Corporation adopted TOCCO for hardening this shifting lever. Results: a savings of 4c per piece—$25 per production hour. TOCCO costs only 17% of former heating method. This is only 1 of 139 parts TOCCO-hardened by Lima-Hamilton Corp. All show savings over usual heating methods.

7 Number 7—the lucky number—is up to you. Why not add your name to the list of companies who use TOCCO Induction Heating to increase production, improve products and lower costs. TOCCO engineers are ready to survey your plant for similar cost-saving results—without obligation, of course.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-5, Cleveland 1, Ohio
Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name_____
Position_____
Company_____
Address_____
City_____ Zone____ State_____

ALUMINUM EXTRUSION TOOLS *demand* FINKL QUALITY

. . . and quality that only 76 years of metal working experience can impart. W4X Hot Work Steel made by Finkl, meets the requirements for aluminum extrusion tools such as mandrels, liners, rams, and adapters. We manufacture containers as well as reworking and relining used containers. Quality control, from steel making in our own melt shop, through forging, heat treating, machining and inspection makes them the finest tools available.

Hot Work Die Steels made by experts cost you no more than those from non-specialists in hot work applications, and in the long run certainly less. When your next requirements for hot work tooling, die blocks, or forgings are being considered, consider Finkl for the best. Our engineers will gladly offer the advantage of their knowledge and our experience. There is no obligation.

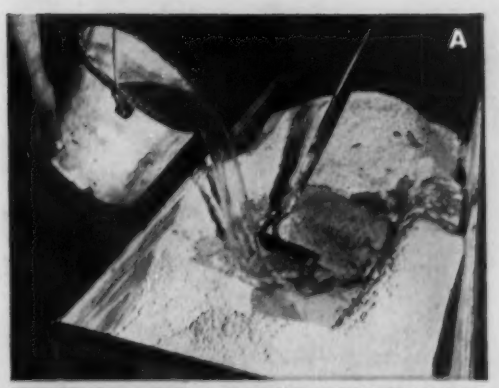
DIE BLOCKS
•
HOT WORK STEEL
•
FORGINGS
•
ELECTRIC FURNACE STEELS

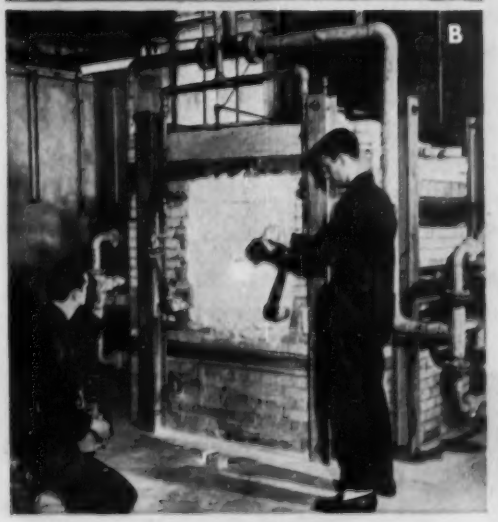
Offices in: DETROIT • CLEVELAND • PITTSBURGH • INDIANAPOLIS • HOUSTON • ALLENTOWN • ST. PAUL • COLORADO SPRINGS • SAN FRANCISCO • SEATTLE • BIRMINGHAM • KANSAS CITY
Warehouses in: CHICAGO • EAST CAMBRIDGE • LOS ANGELES

A. Finkl & Sons Co.

2011 SOUTHPORT AVENUE · CHICAGO 14

NEW B&W 3200 degree Refractory Concrete





Today, in some types of heating and melting furnaces, complete linings or sections of linings are subjected to temperatures over 3000 F and, with the trend to higher and higher operating temperatures, the problem of finding the most economical refractories for this "over 3000 F service" will become even more important.

Now, with B&W's new Refractory Castable-3200, furnace builders and operators can cut installation costs by using castable construction for services up to 3200 F. As easy to use as other B&W refractory concretes, B&W Refractory Castable-3200 can be poured or trowelled into place or applied with a cement gun.

Several years ago, B&W developed Kaocast, the first successful 3000 degree refractory concrete, to lead this high temperature castable trend. B&W Castable-3200, like Kaocast, is made with an alumina-silica base and is recommended for temperatures from 2600 to 3200 F. Because of its very high temperature properties, it is not recommended for temperatures below 2600 F.

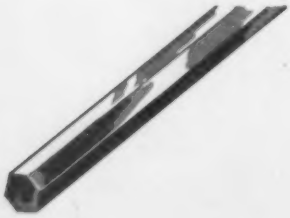
If you have not taken advantage of the fast, low cost installation of castables for your high temperature requirements, we suggest you investigate B&W Kaocast and the new B&W Castable-3200. Your local B&W Refractories Engineer has all the facts.

A Mixed like structural concrete, B&W Refractory Castable-3200 can be poured, trowelled or gunned into place. • **B** High temperature laboratory furnace lined with B&W Refractory Castable-3200.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick
B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars
OTHER B&W PRODUCTS: Stationary & Marine Boilers and Component Equipment
Chemical Recovery Units • Seamless & Welded Tubes • Pulverizers • Fuel Burning Equipment
Pressure Vessels • Alloy Castings

BABCOCK & WILCOX
THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST. NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

B-330



The Indispensable Ingredient....

WHAT AM I?

I attract buyers

I build sales

I provide job security

I cost nothing. Yet I should be a part of everyone's handiwork

I am an integral part of fine craftsmanship

EVERYBODY WANTS ME

I am your responsibility

I create friendship and good will

I inspire respect and confidence

I assure acceptance of your work

I am often not seen. But I am a most important ingredient

I AM *Quality!*

QUALITY is the guiding spirit of our research
the goal of our steel production
the tradition of our service

When you employ B&L Cold Finished Bars in your manufacture this *indispensable ingredient* carries assurance of consistent steel uniformity, uncompromising adherence to tolerances, dependable machinability and suitable service of the fabricated end-products.

PRODUCTS

COLD DRAWN BARS
GROUND SHAFTING
SCREW STOCK
EXTRA WIDE FLATS
ALLOY BAR STEELS
SPECIAL SECTIONS

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES
IN ALL PRINCIPAL CITIES

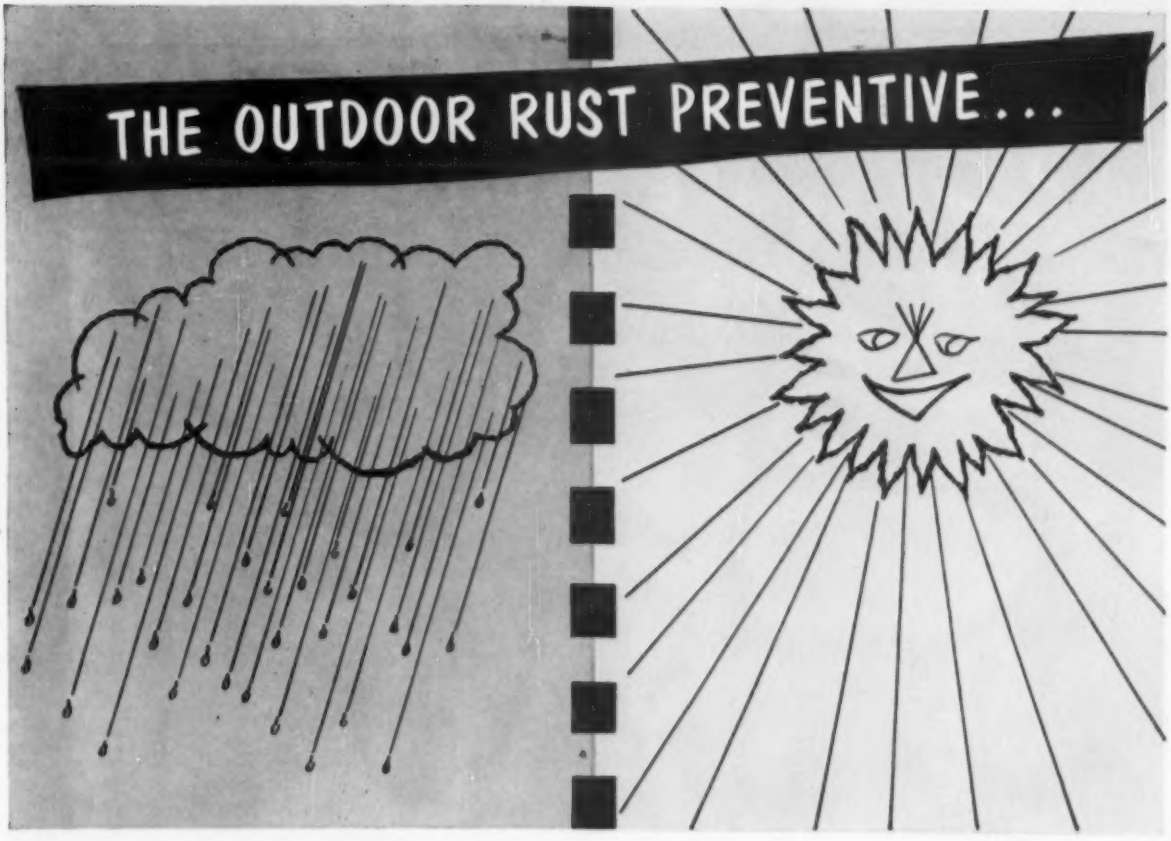
FOUR PLANTS:—

HARVEY, ILL.

DETROIT, MICH.

BUFFALO, N. Y.

MANSFIELD, MASS.



Houghton RUST-VETO 344 *protects metal the year 'round with one application!*

RUST-VETO 344 was developed by Houghton primarily for long-lasting outdoor protection of steel, brass, aluminum and copper. In this *one* multi-purpose rust preventive you get all these advantages:

- ★ **Fast-drying—handle 4 hours after applying**
- ★ **Tough, thin (.003") film is rosin-free**
- ★ **Won't harden, crack or peel in use**
- ★ **Easily cleaned off with solvent soaked cloth**
- ★ **Safely withstands 30 cycles in 100° humidity**

Get latest bulletin. Ask the Houghton Man or write E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

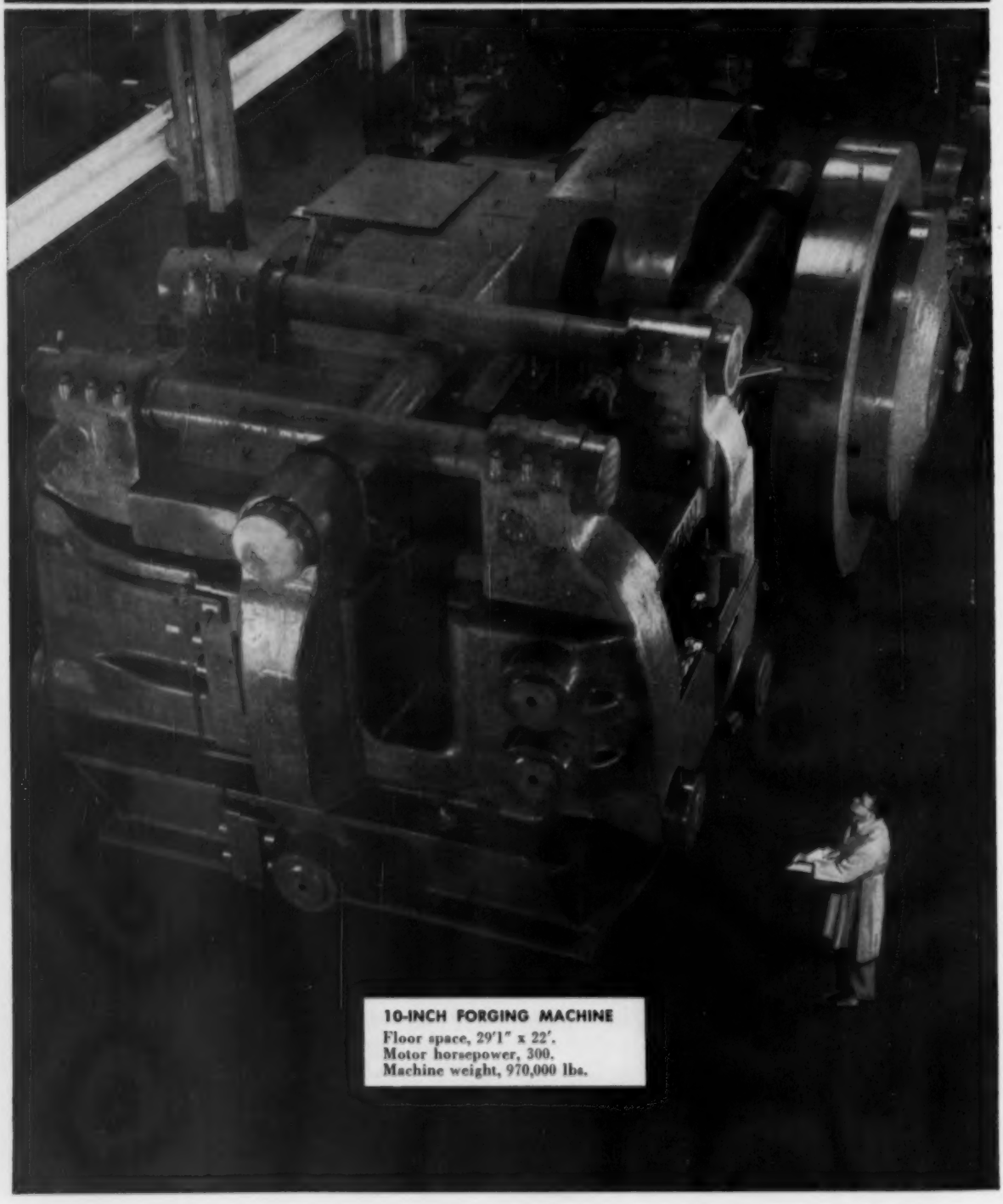
RUST-VETO 344

. . . a product of

E F HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

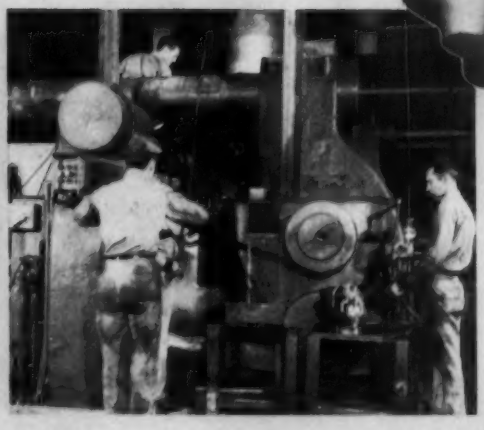
Ready to give you on-the-job service . . .

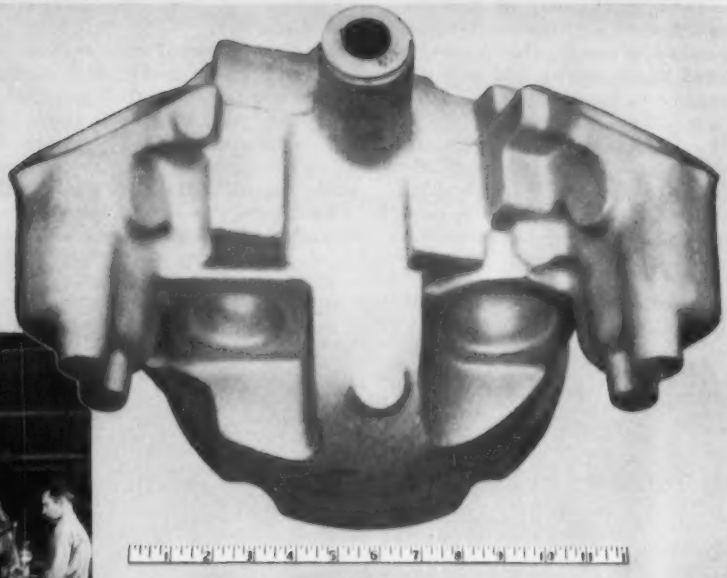
TUBE TURNS INSTALLS the World's Largest



10-INCH FORGING MACHINE
Floor space, 29'1" x 22'.
Motor horsepower, 300.
Machine weight, 970,000 lbs.

A 10-INCH NATIONAL . . . Horizontal Forging Machine!





Forging aircraft engine cylinder heads at Tube Turns.

Tube Turns of Louisville, Ky., relies upon a 10-inch National — the largest horizontal forging machine in the world — to produce efficiently the 72-pound aluminum aircraft engine cylinder head forging illustrated above.

The progressive Tube Turns organization — a division of National Cylinder Gas Company — has long been recognized for its leadership in producing important commercial and aircraft forgings. The installation of the 10-inch Forging Machine is another step in the company's progress.

This is another example of teamwork between forward-looking industry and National Machinery to develop advanced forging methods. To help you "flow metal," our years of experience are available to apply to your forging job, be it routine or unusual, hot or cold, ferrous or non-ferrous, automatic or semi-automatic.

We would be pleased to welcome you at our plant — "World Headquarters for Forging Engineering" — where tomorrow's new and better ways of producing metal parts are already being tested today!

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO — SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

How TIMKEN® bearings cut maintenance, simplify lubrication for Steel Company of Wales

THE rolls of this 45"x115" blooming and slabbing mill, in operation at the Steel Company of Wales, England, were mounted on Timken® tapered roller bearings by the builder, United Engineering and Foundry Company, to handle the heavy loads with minimum maintenance.

The lubrication system necessary is simple, and quick release couplings attached to the grease supply pipes enable roll change time to be reduced to a minimum. Also, there's less lubricant leakage during operation because Timken bearings hold roll necks and housings concentric, making closures more effective.

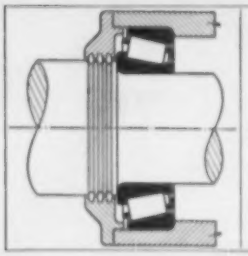
Since the tapered construction of Timken bearings enables them to take radial and thrust loads in any combination, maintenance is reduced. Special thrust bearings aren't needed. Chock mountings are simpler and more compact. Weight is minimized.

Savings in power consumption are considerable. The mill can accelerate faster because the true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction.

For help in designing your bearing application, consult our engineering department. We may be able to help you devise a better way to do the job. The Timken Roller Bearing Company, Canton 6, O. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

UNITED ENGINEERING AND FOUNDRY COMPANY mounted the rolls of this Steel Company of Wales blooming and slabbing mill on Timken tapered roller bearings. Typical Timken bearing roll neck application is shown in cutaway.



LUBRICANT STAYS IN —DIRT KEPT OUT

Because Timken bearings hold shafts concentric with housings, closures are made more effective. Lubricant is retained, dirt and moisture kept out.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬮ AND THRUST ⟷ LOADS OR ANY COMBINATION ✳

Eriez Permanent Magnets to SEPARATE... RETRIEVE...PURIFY

OLD IRON PANTS AND THE MAGNET. A lady from yesterday with a metal-ribbed girdle wouldn't be safe next to an Eriez Permanent Non-electric Magnet. She might easily be "hung up" by the powerful Alnico V action. This idea of herculean power and permanent dependability now offers the metalworking industry many new ideas for separation, purification, and retrieving of ferrous material from places where it would cause machinery damage or product defects. In addition, Eriez Magnets designed to control and convey metals at high speeds have presented new concepts in plant automation.

SOLVE HUNDREDS OF METAL-WORKING PRODUCTION PROBLEMS

● Famous for years as magnetic separators to remove tramp iron from processing lines of all kinds, Eriez Permanent Non-electric Magnets have recently found widespread acceptance in the metalworking industry, where they are used to separate, retrieve and purify. In addition, Eriez Magnets especially designed for controlling and conveying purposes, move steel horizontally, vertically, or up steep inclines at such speeds as to allow peak production. Easily installed on new or existing equipment, Eriez Magnets have opened up many new ideas in plant automation, and are destined to play a major role in the metalworking industry. *All Eriez Magnets are non-electric, self-contained. They have no wires or attachments. There is no operating cost; first cost is the last. Powerful Alnico V elements are guaranteed to keep their strength indefinitely.*

Write for big new "Magnets for Metalworking" Bulletin

MAGNETIC IDEAS FROM ERIEZ

ERIEZ SHEET FANNER MAGNETS. Here's the magnet to speed up sheet metal handling and increase production. Slow, costly hand separation is completely eliminated . . . no more double feeding, no scratched surfaces, no cut fingers. An Eriez Sheet Fanner Magnet placed next to a pile of sheet metal *automatically* lifts the top sheet into the air, allows fast, safe removal. When this sheet is removed, the following one automatically rises. Ideal for irregular, odd-shaped sheets. Available in five strengths.

ERIEZ DIP TANK MAGNETS. Here's a handy piece of magnetic equipment designed for fast, sure removal of ferrous materials from tanks, etc. Powerful, permanent magnetic bar element will snap up and hold liberal amounts of metal parts, fine iron particles, etc., from dip tanks, plating tanks, hydraulic system oil reservoirs, acid baths, vapor degreasers, heated ovens, etc. Runners make it exceptionally easy to maneuver on tank bottoms. Standard models are all-stainless steel construction with handle length up to 8 feet. Approximate weight: 16 pounds.

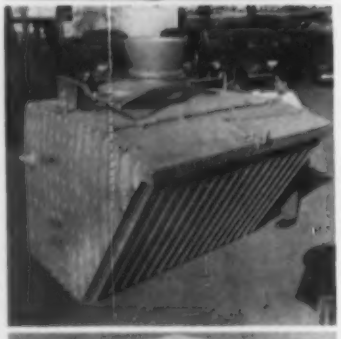
ERIEZ MAGNETIC AGITATOR DRUMS. Here's the unit designed to eliminate slow, costly separation of magnetic from non-magnetic materials. Easily installed at the discharge end of spouts, screw conveyors, gravity flow chutes, etc., the powerful action of the drum's specially located Alnico V elements automatically separates the material as fast as it is fed to the drum. Ideal installation for sand blast reclamation, chip material separation, and wherever there is a high concentration of medium sized ferrous material.

ERIEZ MAGNETIC FERROUS CLEANER. Designed to magnetically remove fine iron contamination from liquids, the Eriez Ferrous Cleaner is a lightweight, portable non-electric separator that can be placed at more than one convenient place in a processing line. Thin flows of powder can also be cleaned of iron if the unit is used in conjunction with a vibrating feeder. Adjustable gate controls the rate of feed onto the chute and magnetic grid. Removable grid with 124 magnetic fingers is easily cleaned. Effectively prevents rust spots and product spoilage.

Eriez "Magnetic Ideas" can help you. Eriez factory-trained field men, backed by extensive laboratory and engineering know-how, will be happy to study your particular metal handling problem and offer helpful "Magnetic Ideas". Our representatives are always glad to work with your engineering department or consulting engineers on any problem, large or small. For additional information concerning magnetic problems in the metalworking industry, write for new bulletin B-207. Address Eriez Manufacturing Company, 1008 Magnet Drive, Erie, Pennsylvania.

Briefly, this ad illustrates why DEMPSTER-DUMPSTER SYSTEM

Container at right has cast iron bottom and inside walls are lined with fire brick. It handles hot skim off aluminum.



This Tilt Type Container was the result of a cost-cutting idea whereby a high temperature dusty product would be handled by a plant's Dempster-Dumpster. Container has cooling fins, counter-balanced hinged lid with 3-way locking device, 16" sliding gate valve and two sight-glass inspection openings.

Here is a Hopper Type Container with a top door for filling and two bottom discharge doors operated by rack and pinion. Another case where the Dempster-Dumpster System was applied to an additional problem to further reduce costs.

Container at right is just one of several different types we have designed to handle equipment, materials, packages, parcels, etc.

IN A NORMAL INSTALLATION the Dempster-Dumpster System is purchased by a plant because of its proved record for handling bulk materials at tremendous savings. This normal installation usually includes one truck mounted Dempster-Dumpster and any number of standard containers designed to meet the various requirements within the plant. In some cases, containers number 40 to 50. These containers can range in capacity up to 21 cu. yds., with all containers served by the one Dempster-Dumpster.

In the great majority of cases this basic installation is just a starter. Management men, constantly looking for lower operating costs, find numerous and amazing extra savings in the Dempster-Dumpster System. Once in service, transporting developments of every description come to light that supplement the original functions of the equipment. Your own men find easier, quicker and additional cost saving ideas for its use. Many even overshadow the original savings and the equipment becomes more and more indispensable.

Look over just a few of the "Special" containers illustrated in this ad. They are all the result of rough ideas that originated with the men in plants after a basic installation, then developed by our engineers. All ideas were stimulated by the powerful Dempster-Dumpster and its flexibility in picking up, hauling, setting down or dumping anything that needs transporting, at lower cost.

One man, the driver, and a few simple hydraulic controls in the cab of a Dempster-Dumpster, will become indispensable in your plant. It is just that in hundreds of plants of every description throughout the nation. Let one of our representatives give you details of installations. Manufactured exclusively by Dempster Brothers, Inc.

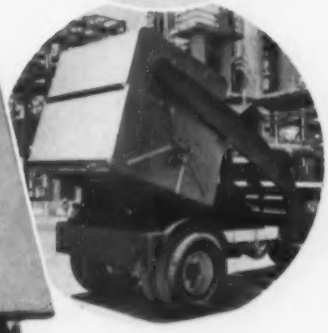
Above container is built with cast iron liner. The holes in outer wall are for cooling.

Here is one of several special drop bottom type containers equipped with coupiers and ball bearing trucks for operation in train on rails.

THE DEMPSTER DUMPSTER SYSTEM

DEMPSTER BROTHERS

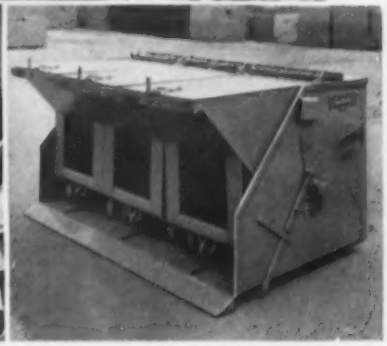
so many plants find the indispensable...



Two photos above show how all containers, regardless of design, are picked up and hauled. At destination materials are dumped from drop bottom containers as shown at left . . . from Tilt and Skip Type Containers by tilting. Any load, of course, may be set down intact.

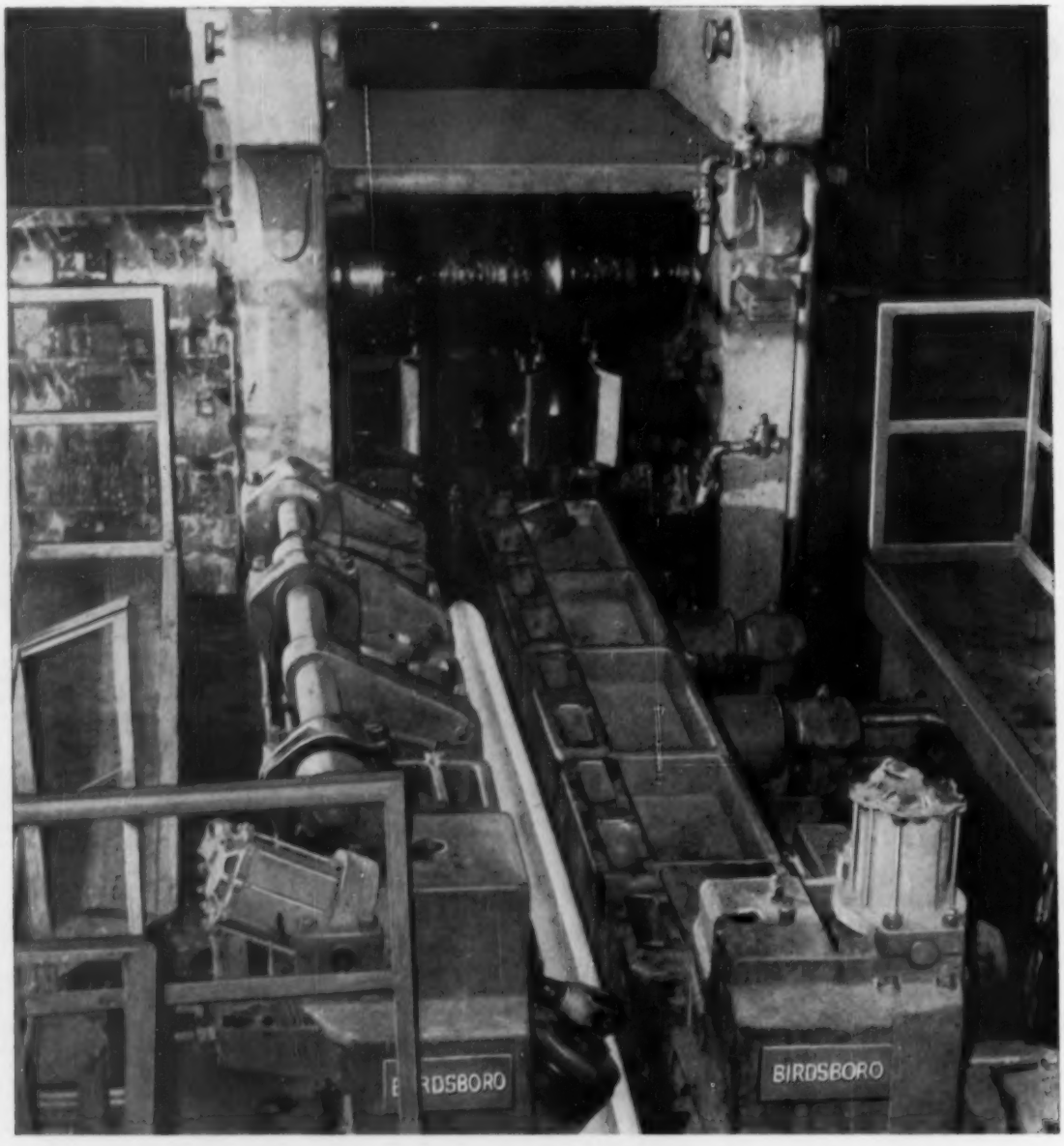
This is a special adaptation whereby waste zinc slurry is pumped into two containers, which serve as settling tanks, enabling majority of the water to be decanted before sludge is transported and dumped at waste basin.

Tank Type Containers are available with or without casters in steel, aluminum, stainless steel, etc. Capacity ranges up to 1,200 gal. They may be lined with rubber, lead, highly resistance coatings, etc.



This is a master container with three 2 cu. yd. Insert containers. Each insert container is provided with casters, counter-balanced spring-hinged lid for loading and dumping.

455 North Knox, Knoxville 17, Tennessee



BIRDSBORO can help you cut costs

with more *automatic* operation

Tonnage from this BIRDSBORO 3-high mill is raised substantially by semi-automatic features. These include tilting table, side guard manipulators, finger lift for turning square and rectangular shapes, and auxiliary manipulator for turning diamonds and squares.

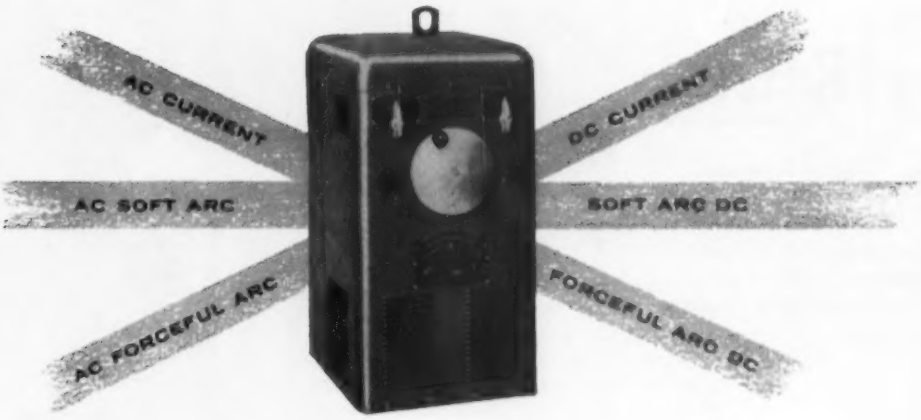
Savings in labor costs, higher quality and dependable performance are other advantages you can count on when you call in BIRDSBORO engineers for anything from a single unit to a complete plant.

Designers and Builders of:

STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.



Because welding costs can be cut more:

ALL PRODUCTION WELDING WILL EVENTUALLY BE DONE WITH "IDEALARC" TYPE WELDERS

Shouldn't you start using Lincoln Idealarcs now?

FIGURE THESE FACTS:

1. Idealarc welding is easier, faster. On AC welding you have the smoothest, most stable arc ever known—*plus*—choice of soft-arc and forceful arc on every job . . . to give you top speed.

2. Idealarc handles all your jobs AC and DC. You can standardize on one machine for all production welding. You can buy Idealarc as an AC-DC machine . . . or as a straight AC welder to which a DC unit can be added at any time.

GET THE WHOLE STORY—Write for Bulletin 1343

THE LINCOLN ELECTRIC COMPANY

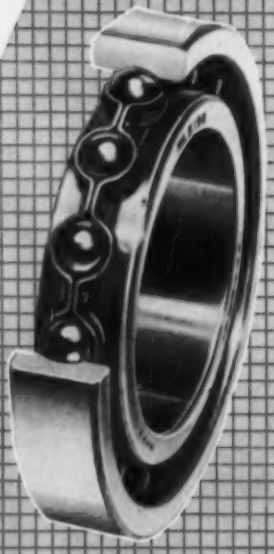
Dept. 1505 — Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Nuts and Bolts...

Tightening and removing 5" diameter nuts and 3¼" diameter bolts on a 115,000 HP Hydro-Generator! A rugged task, but this rugged Air Impactool is equal to it! And, like so many hard-working tools, it uses hard-working anti-friction bearings. Federal Ball Bearings, of course!

Ingersoll-Rand



so much of industry *turns* on FEDERAL ball bearings

On tough jobs or rough roads... in the machine shop, office or on the farm. Wherever anti-friction problems need to be solved—that's where you'll find Federal Ball Bearings at work. There are hundreds of types—12,000 sizes—and they're produced by a 50-year-old manufacturer of ball bearings *exclusively!*

When Federal Ball Bearings are part of so many things you *use*, shouldn't they be part of the things you *make?*

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

Latest ball bearing and engineering data! Full 175 pages of it—in FEDERAL'S *NEW* CATALOG! Just speed us your request and we'll speed you back your copy!

or Ruts and Jolts...

Our old friend the Jeep—new CJ model. As ever; daring, dependable, durable—on the road or off! It, too, is served by reliable Federal Ball Bearings—doing their anti-friction job in the gear transmission.

Federal BALL BEARINGS

One of America's Largest Ball Bearing Manufacturers

FACTS ABOUT Exide®
IRONCLAD® INDUSTRIAL TRUCK BATTERIES

SPEED UP "SET UPS" ...GET FASTER PRODUCTION!

ELECTRIC TRUCKS POWERED WITH EXIDE-IRONCLADS GIVE YOU THE MOST DEPENDABLE, LOWEST-COST METHOD OF MOVING LARGE DIES, MAKING MACHINE SET-UPS FASTER, SAFER, EASIER. IRONCLADS DELIVER AMPLE POWER INSTANTLY, ENSURING SMOOTH, PRECISE MATERIALS HANDLING. TRUCKS WORK THROUGH TO THE LAST MINUTE OF THE SHIFT...WITH NO UNSCHEDULED DOWN-TIME. LOWER COSTS FOR OPERATION, MAINTENANCE AND DEPRECIATION MAKE EXIDE-IRONCLADS YOUR BEST POWER BUY— *AT ANY PRICE!*

TUBES OF POWER

INSIDE EVERY IRONCLAD ARE SLOTTED TUBES THAT KEEP THE ACTIVE MATERIAL IN FIRM CONTACT WITH CONDUCTING GRIDS OF THE POSITIVE PLATES. THE ELECTROLYTE FLOWS EASILY THROUGH THESE NON-CORRODING SLOTS TO REACH MORE ACTIVE MATERIAL FASTER. RESULT: AN IRONCLAD DELIVERS GREATER POWER... FOR A LONGER TIME... AT LOWEST COST!

- PROTECTED SILVIUM CONDUCTING GRID
- COMPRESSED ACTIVE MATERIAL
- SLOTTED POLYETHYLENE RETAINER TUBE

HANDLE MORE TONS PER SHIFT!

EXIDE-POWERED LIFT TRUCKS HELP YOU STACK MORE PARTS FASTER, MAKE FULL USE OF HIGH-PRICED SPACE. IRONCLADS GIVE YOU SPLIT-SECOND TRUCK HANDLING, PRECISE SPOTTING SO THAT STACKING CAN BE HIGHER... AND WITH LOWEST HANDLING COSTS PER TON!

LET EXIDE HELP SOLVE YOUR INDUSTRIAL TRUCK BATTERY PROBLEMS. ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ❷ WRITE FOR FORM 1982, A MANUAL ON INSTALLING AND MAINTAINING MOTIVE POWER BATTERIES.

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

The stainless you need is here

2221 sizes, shapes, finishes and types actually in stock

Here, in the world's largest stainless stocks, the exact steel you need is ready for immediate shipment—in any quantity. That's because Ryerson carries more tonnage in more types, shapes and sizes than any other source. Many requirements are available only at Ryerson. And, all Ryerson stainless is time-tested Allegheny Metal, the quality stainless you can depend upon.

Here experienced steelmen who know your industry's requirements are ready to work with you. And unexcelled specialized facilities are at your disposal for sawing, shearing, flame-cutting or otherwise preparing stainless to your exact specification.

So for every stainless requirement—and for every kind of carbon and alloy steel as well—call Ryerson for quick, dependable service.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age Newsfront

Automation and the Steelworker

Steel labor is in a fighting mood over the impact of automation on its membership. United Steel Workers leaders are indicating they will ask industry to do one of two things: (1) Find other jobs for workers displaced by automatic equipment, or (2) install a short work week with no reduction in pay. These objectives probably will be pursued at next year's contract negotiations.

Glass Pipe Market Studied

Some glassmakers feel there may be a broader market for large glass pipe. They point to the successful use of smaller sizes in handling corrosive chemicals such as chlorine, and in the food processing and dairy industries. Now they're asking: What is the market potential for 12, 18, and 24 in. glass pipe?

Auto Sales: Colors Brighten Parking Lots

Brilliant spots of color on the nation's parking lots give you a quick bird's-eye check on auto sales throughout the country. Seen from a plane, a vivid color mosaic shows up where sales of 1955 cars have been heavy. Where the pattern is drab, sales of cars have crawled.

Wider Interest In New Rail Cars

More major railroads are mixing millions with carbuilders' "forward look" designs to boost passenger revenues, cut operational costs. A good bet: Wider use of low-alloy, high-tensile steel structure or underframe, aluminum superstructure, stainless steel skins. Builders figure they can cut costs sharply if new "Talgo-type" trains are quantity produced.

Longer Telecasting Lines Possible

Recent telecasting experiments have resulted in direct television and multichannel telephone transmission through space for as much as 200 miles, without relay stations.

New Methods Will Save Millions

Chipless machining and development of "draftless precision forgings" are two areas in which the mass production industries are expected to concentrate during the years immediately ahead. Major savings in labor and equipment are expected to result in gigantic dollar savings annually.

Cold Reduction of Titanium, Zirconium

Titanium bar 5/16 in. in diam, made of powder metal, has been successfully cold rolled to form 1/16 in. welding rod with only one intermediate heat treat. Finished rod is of high density and retains sufficient ductility to be wound on standard spools. Equally remarkable reductions have been achieved with pure zirconium bar.

Electronic Equipment Upkeep High

Initial payment for military electronics gear is much less than the continuing expense of maintaining it. Air Force spends about twice as much annually to keep equipment in condition as to buy it originally. Navy estimates upkeep outlays during life of its gear are about 10 times the first cost.

If UAW Wins, Will Steel Talk GAW?

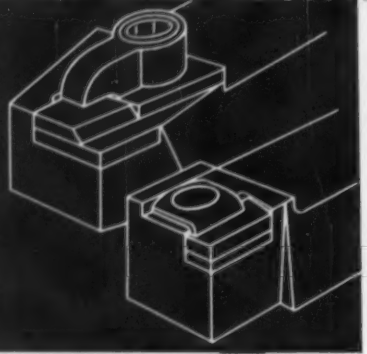
If automotive labor wins guaranteed wage, steel labor may ask steel producers to discuss the issue this year. Any decision to do so would be purely voluntary on the industry's part. Only subject negotiable this year under the contract is wage rates.

Ash Fouling Problem Grows

Wider use of lower-grade coals by steam generating plants has made ash fouling a growing problem. Stocks and sources of higher-grade fuels are dwindling, costs of such fuels rising. Trend change in fuel use is expected to continue over the next 15 to 20 years.

LIKE ENGINEERED COST-CUTTING TOOLS . . . . . .

which permit speeds and feeds that would burn up yesterday's best, yet seem to run on and on with little sign of wear . .



CMP *cold rolled strip steel...*

CAN HELP YOU SAVE TIME AND CUT TOOL COSTS

Frequently, CMP can do as much and more to help you save time and cut tool costs as modern tools themselves.

By processing cold rolled strip steel to restricted specifications, it often is possible to develop working qualities that will permit forming operations to be speeded up as much as 25% without increased tool wear.

Again, qualities may be imparted to the steel which will permit simplification of tooling, and even elimination of operations.

And, always, because of the customary dimensional precision of CMP Cold Rolled Strip Steel, there is more footage per coil . . . fewer coil replacements are required on automatic-feed operations . . . there is less tool wear . . . fewer stops for tool changes and assembly is speeded.

You are invited to use CMP's experience along this line with a view to developing restricted specifications to cut your end-product cost.

CMP
WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

LOW CARBON
HIGH CARBON
Annealed or Tempered
STAINLESS
ALLOY
ELECTRO ZINC COATED

PRECISION COLD ROLLED CMP STRIP STEEL

the Cold Metal Products co.

GENERAL OFFICES: YOUNGSTOWN 1, OHIO

PLANTS: YOUNGSTOWN, OHIO AND INDIANAPOLIS, IND.

SALES OFFICES: New York • Cleveland • Detroit • Indianapolis
Chicago • St. Louis • Los Angeles • San Francisco

NEWS SECTION SPECIAL REPORT

Europe's Boom Means Dollars For U.S.

American business has shot at new and expanding markets . . . But competition from Europe will be stronger too . . . Boom puts pressure on metals supply . . . Consumer market grows—By *E. C. Kellogg.*

◆ WEST EUROPEANS have nibbled at prosperity during the last 2 years and they want more. With their economy continuing to boom, the indications are they'll get it.

For the U. S. this means American businessmen will have a crack at new and expanding markets. It also means stiffer competition both abroad and at home. And with industry in both the U. S. and Western Europe chewing up materials at record rates, there will be continued pressure on supplies and prices of raw materials—particularly metals.

Europe's new economic strength also means a stronger defense against Communism, means less dollar aid will be needed from the U. S. in that area. And it may mean Europe will be able to help us build up Asia.

The Real Story

There are a lot of impressive statistics that point to the fantastic pace the West European economy has set during the last 2 years: industrial production in '54 was up 8 pct from '53, has jumped 57 pct since 1947. Trade between European countries is expanding unbelievably. In 1953 it was running 50 pct ahead of postwar levels and last year it gained another 10 pct. Compared with 1947, exports for West European countries have soared 75 pct while imports have increased 35 pct.

But there are more important indicators of what's happening in Europe than cold statistics. It's the drone of more than a million motor scooters whizzing along roads in Italy, the torn up ration books in England, the end of the money black market in France, the plans of more than 400,000 Germans to buy new TV sets this year—these are the human statistics that tell the real story.

Getting Like Americans

What sticks out most clearly in Europe's newfound prosperity is the fact that this is not just a temporary economic upswing. A basic change is taking place in the people and what they want.

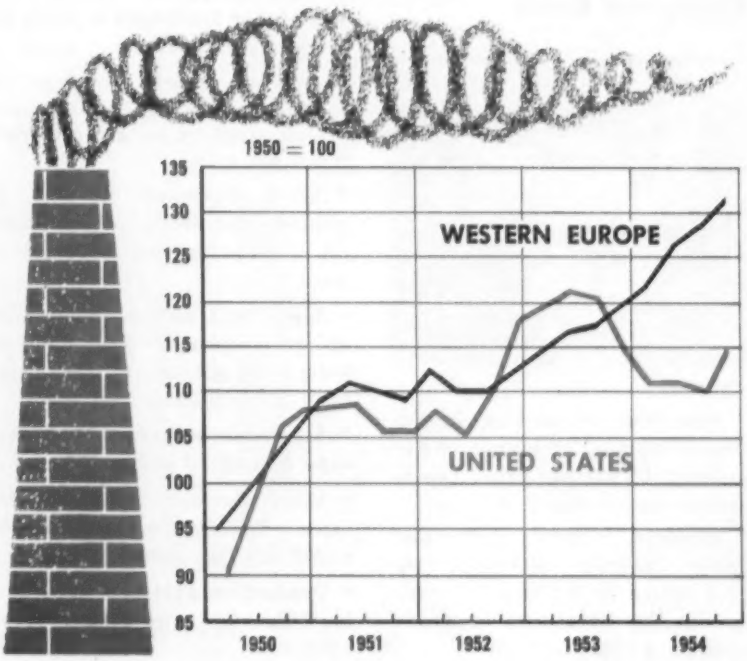
Having spent most of the postwar years trying to get back to where they were before the bombs were dropped, they are now clamoring for a higher standard of living. Result: a scaled-down version of the American consumer market is in the making.

Not everyone, everywhere in West Europe can have them yet, but the desire to own a car, a refrigerator, a washer or vacuum cleaner is definitely there.

Ten years from now, 1954 may be regarded as the jumping off point for an entirely new era in European economic history. It is marked by emergence of a large size middle class with substantial purchasing power.

Many aggressive U. S. business firms are already moving to cash in on the new markets developing in West Europe. That's why so many American firms have opened

Industrial Production Index, Europe, U. S.



up manufacturing and assembly plants in Europe in the last few years.

Biggest potential for American firms selling to Europe right now is in appliances, office equipment, chemicals, drugs, plastics, aerosol spray products, to mention a few.

And the outlook for increased sales of American products in Europe is improving because discrimination against dollar product imports is fading as West Europe's financial position improves. The prospect for this year is that West European governments will further ease restrictions on imports from the U.S.—particularly if America liberalizes its trade policies.

Boom Causes Scarcities

It all adds up to more business for everybody. But the boom is bringing headaches too. The increase in production here and in Europe has created a real scramble for metals.

Even though steel is extremely tight in the U. S., demand from Europe is so strong that steel exports this year will hit around 3.7 million tons compared with 3 million tons last year.

While at present the scrap market here is easing temporarily, demand from West Europe has been so strong that the U. S. had to put through modified export controls earlier this year.

Other effects of the combined U. S.-West European economic surge show up in the form of aluminum shortages, scarcities and higher prices for copper, pressure on quicksilver, nickel and cobalt. Unfortunately, some metal, particularly scrap, is being reshipped behind the Iron Curtain.

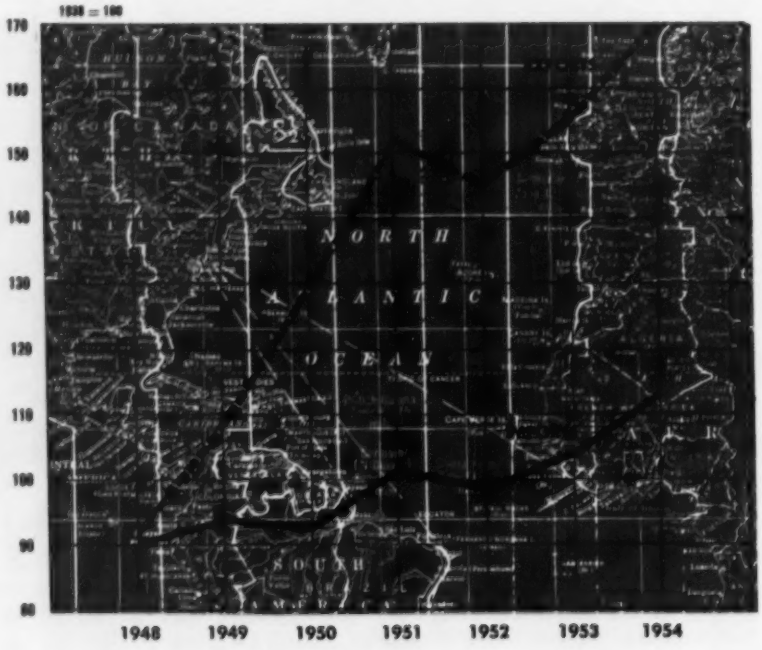
Oil supplies, however, should be improved this year in spite of greater demand. Effect of last year's settlement of the Iranian oil dispute after 40 months of lost production is beginning to make itself felt.

Will the Bubble Burst

But some people fear that the European prosperity bubble is due to burst. They point out that postwar reconstruction is over and that, with military spending leveling off, Western Europe's economy may lose its driving force. This view, however, overlooks many important factors that are destined to keep the European boom going:

(1) Though Western Europe has just about completed its reconstruction job, there is tremendous

Europe's Exports, Imports



Highlights of the West European Boom

- **Industrial production in Europe is gaining at a rate of between 8-10 pct per year. This is faster than in the U. S.**
- **Western Europe's gold and dollar reserves increased by $2.2 billion in '53 and $1.5 billion in '54. Total now amounts to around $12.5 billion.**
- **Except in southern Europe there has been a sharp decrease in unemployment. There are even labor shortages in parts of Germany and Britain.**
- **Average hourly earnings in the Netherlands are up 9.8 pct. French workers have registered a 6.4 pct gain.**
- **West Germany is now a greater industrial power than all of Germany was before the war.**
- **Since 1953, auto production in Western Europe has jumped from a 1.3 million per year rate to a 2.1 million annual level.**
- **Electrical output in West Europe gained 10 pct in 1954.**
- **West Germany's Gross National Product is expected to rise 8 pct this year.**
- **Production of Italy's metal using industries is up 29 pct since 1951.**

need for improved productivity which compared with American standards is still extremely low. The big trend in West European industry in the coming years will be the drive to step up productivity.

(2) In making its industrial comeback, West Europe was forced to forget about a large portion of its housing needs. There is now a tremendous pile-up of housing demand that will be extremely important in supporting prosperity.

(3) Government expenditures for roads, railroads and schools had to be bypassed during the reconstruction period. There is a big backlog of work in this field too.

(4) Although per capita consumption since 1950 has been rising, it is still only 11 pct above prewar levels. With wages going up, controls coming off installment buying, consumer wants broadening, a sizable gain in per capita consumption seems likely. Also, redistribution of income in many countries is boosting the purchasing power of the large masses in the lower income groups.

(5) And for the short term outlook, West Europe can't miss benefiting from the U. S. economic recovery. Last year's European boom came in spite of the U. S. recession, so this year should be even better. Also German rearmament will have a stimulating economic effect.

(6) And as yet, Western Europe hasn't had a chance to develop a widespread leisure-time luxury market. This is still to come.

Europe is undergoing a period of significant change and is reaching new peaks in prosperity.

Steel:

Germans will buy $5 million mill from U. S.

At least one $5 million continuous cold roll mill for German steel expansion is coming from the U. S. In Cleveland last week Fritz Berendsen, managing director of the Klockner Co., second largest German integrated steel producer, disclosed his firm recently decided to order a continuous cold roll mill from the U. S. for a new 2 million ton per year integrated mill his firm is planning at Bremen.

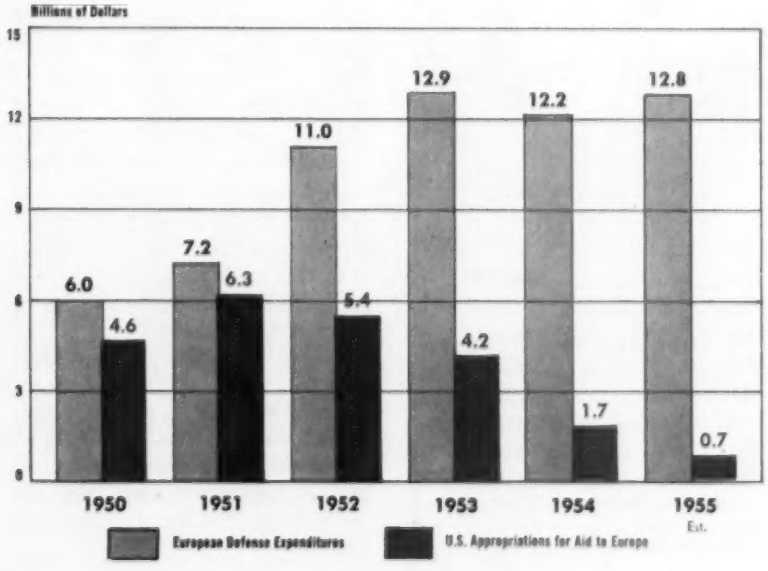
U. S. Firms Bid

Although none of the four U. S. manufacturers, United, Mesta, Bliss or Continental said they had been notified of awarding of a contract last week, several said they had entered bids. The unit is to turn out 54 in. wide sheets.

Mr. Berendsen said the new integrated mill would double capacity of his company which also has a plant in the Ruhr valley where it fabricates locomotives, trucks, bridges, etc. The new Bremen mill is intended principally to turn out ship plate, he added.

Current predictions in Germany now are for 20 million tons by 1960 with 50 million tons in the next decade or so, he said. Germany is on the brink of a 10-year boom with the steel industry participating heavily in buildings, construction and machinery, he feels. Automotive consumption there is "only a trickle."

Defense: Europe More On Its Own



Red Trade Stays Same

Little change is being produced in the pattern of U. S. trade with Communist-controlled countries in Europe as a result of the eased export control policy instituted by the government last August.

Trade volume with the Red bloc rose substantially in the fourth quarter of 1954, the U. S. Commerce Dept. reveals, but there was little broadening of Soviet interest in nonstrategic materials, judged on the basis of export license applications.

In a new quarterly report covering the October-December period, the agency shows applications approved for shipments to Russia and its European satellites had a commodity value of $10.3 million.

Bank Finances Export

Private funds will be used to guarantee nearly $1 million of a total credit of $1.2 million opened by the Export-Import Bank late last year for Westinghouse Electric International Co. and Blaw-Knox Co.

Girard Trust Corn Exchange Bank, Philadelphia, has bought an 80 pct participation in the Export-Import Bank's authorization for the two firms, suppliers of steel fabricating equipment to Manufacturas Metalica Madrilenas, S. A., of Spain.

GAS: Liquefied Petroleum on Highway

Liquefied petroleum gains in truck field . . . New engines aimed at L-P use . . . 1954 market up 25 pct . . . Truck users doubled . . . Distribution, explosion danger, restrain market—By K. W. Bennett.

◆ AFTER SOME SPUTTERING and a few stalls in its early stages, liquefied petroleum gas is accelerating smoothly into an expanding market of automotive, tractor and stationary engines.

Liquefied petroleum gas (a mixture of propane-butane gases that remains liquid under pressure, vaporizes when pressure is removed) got its start with conversions of standard gasoline engines in the 1940's.

At the end of 1954, L-P powered vehicles included 200,000 tractors and 2500 buses, besides an aggregate of at least 9200 stationary engines, lift trucks and over-the-highway trucks.

L-P gas use as a motor fuel advanced last year 25 pct over 1953 to a figure of 625 million gal.

Reo Motors recently announced a 220 hp V-8 engine burning this fuel that was once sold largely as bottled gas for home cook stoves. International Harvester also has been in the field since 1952 and at least one major automotive producer is expected to bring an L-P truck engine onto the market next year.

The number of trucks produced as L-P gas users doubled over the year previous. And L-P powered farm tractors rose by 23 pct in a year that was marked by a general falloff in farm sales. In a year of general business slowing, the number of trucks, buses, stationary engines and lift trucks built to burn L-P gas rose 42 pct over the previous year.

Two city transit firms using propane buses estimate 400,000 to 500,000 miles wear on an L-P burning engine (no carbon, no deposits) before any extensive engine repair is necessary. Oil changes are just about halved. The trucker's raw fuel cost per gal is low, even with the lower Btu rating of the propane-butane mixture.

But two major factors have been holding back the advance of propane-butane use in the trucking field. Mistrust of L-P gas as a dangerous and explosive fuel mixture, and lack of refueling stations capable of handling over-the-highway trucks.

Distribution Improves

The explosion danger has been overplayed; even insurance companies are revising their opinion. Consumers haven't waited that long, as evidenced by the advance in L-P motor fuel consumption. But in several areas, severe local ordinances governing storage of L-P gas have discouraged consumers.

Distribution is still a problem, but is being licked. An estimated (conservatively) 4000 fuel distribution points include at least 2000 capable of refueling over-the-highway trucking. A few operators are reported installing their own refueling way-stations.

Inquiries Gain

This year will see a strong drive to sell L-P gas to the trucking industry, and Reo's V-8 truck engine is merely an opening gun. A major oil producer has assigned men in every state to push L-P.

The new inquiry rate suggests that part of the selling job is already done. One fleet owner last week completed plans to install 55 trucks, 20 of them fueled with L-P gas. If they prove out, later replacements will be entirely L-P fueled.

Total Liquid Petroleum Gas Consumption

Thousands of Gallons			
1940	313,456	1947	2,209,797
1941	462,852	1948	2,736,801
1942	585,440	1949	2,836,599
1943	675,233	1950	3,402,567
1944	1,060,156	1951	4,227,275
1945	1,276,766	1952	4,477,379
1946	1,704,262	1953	4,932,009
		1954	5,134,000

COAL: Mechanization Is a Must

Expenditures for mechanized mining equipment mount . . . Continuous miners cut costs, increase output . . . Giant shovels and hauling equipment take over stripping . . . Mines show profits—By T. M. Rohan.

◆ COAL INDUSTRY in the U. S. is betting millions on a comeback with the help of high speed, high efficiency mining equipment capable of cutting costs up to 50 pct.

About $5 million worth of these gleaming new tools were on display in Cleveland last week for the American Mining Congress annual Coal Show.

As an indication of the trend, Joy Manufacturing Co., Pittsburgh, which supplies 75-80 pct of underground production equipment, has had its backlogs shoot out from 60-day delivery in February to 150 days now, and lengthening all the time.

Record Buying

Joy's sales of new high speed continuous underground equipment last year hit $28 million and this year will be up to almost $40 million, J. D. A. Morrow, Joy president, told THE IRON AGE.

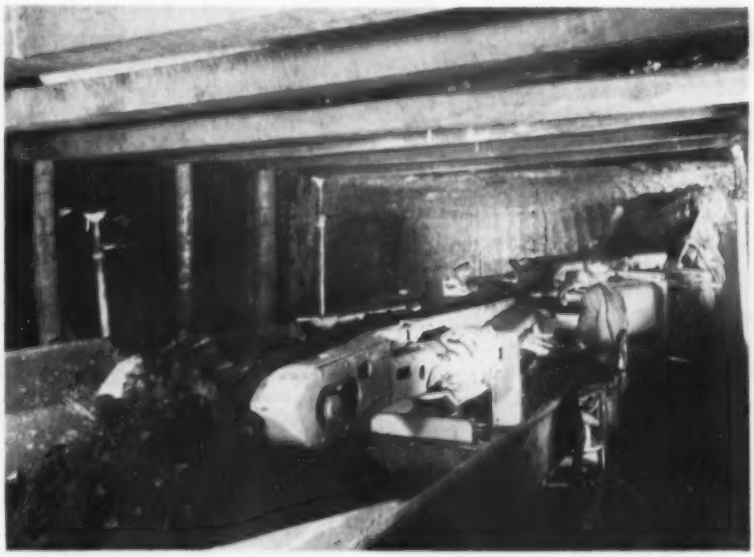
Although no official industry expenditure figures are available, indications are that new equipment buying this year will surpass the peak years of 1953 and 1946, probably by a substantial margin.

Extent of mechanized mining is indicated by a new high speed continuous boring miner which simply burrows its way through coal veins like a giant mole, spitting out the coal behind onto an endless belt which moves it away.

Fantastic production increases are made with these machines. Until a few years ago, seven men could turn out from 30 to 40 tons a shift. The new twin borer shown by Joy for the first time will produce between 600-1000 tons a shift with the same 7-man crew.

Continuous Cuts Costs

The new twin type is operated by a single man and takes a cut up to eight ft high and 12 ft wide, boring and placing its own roof support bolts as it moves along.



NEW HIGH-SPEED continuous boring miner burrows through coal veins like a giant mole. Purchases this year will top peak buying years of 1953, 1946.

Continuous models already represent 50 pct of Joy's output and the machines are also going to work on other types of underground mining operations. The company is even helping customers finance purchases if prospects look good.

Continuous mining machines were worked on as early as the 1940's, but commercially successful models have been in use only a few years.

Big Equipment

Obviously, their success lies in cutting costs. One Joy machine used in an Ohio mine has increased output 30 pct, at the same time enjoying a comfortable profit margin. An Alabama firm financed a new mining venture on the condition that continuous mining equipment be used.

For stripping overburden with scrapers, a host of new powerful earthmoving equipment is being offered. Stripping shovels of 30 to 45 cu yd capacity are not uncommon today and larger shovels will be in operation at large strip mines. Shovels for loading coal with a capacity of 10 cu yd are used on larger operations and bulldozers and rubber tired scrapers and track-type tractor drawn scraper units have also followed the trend of increased capacity.

Coal hauling units carrying payloads of 40 tons have found wide usage in strip mines and a few operations have specially designed trailing units that are capable of hauling 60 to 70 tons of coal.

H. A. Raivio, of Caterpillar Tractor, predicts that in designing of future coal hauling units, greater consideration will have to be given to horsepower to weight ratio, capacity, maneuverability.

MATERIALS: Smart Handling Pays

Even old buildings are no obstacle to improved materials handling . . . Radio communication equipment is solving many problems . . . Vacuum lifting device draws considerable interest at show—*By K. W. Bennett.*

◆ HOW MUCH does materials handling cost?

Three out of four managements admit to having no figures on this point. Investigation indicates that less than one in 20 really knows.

J. R. Bright, Harvard Graduate School of Business Administration, made these points before some of the 30,000 builders and buyers attending the sixth national Materials Handling Exposition at Chicago. And management can't solve the riddle, Mr. Bright added, by losing itself in dreams of a brand new plant building in which the materials handling problem can be blissfully automated out of existence.

In 1947, 72 pct of our industrial buildings were over 25 years of age and at least half were older than 35 years. The only solution: learn to live with what you have. Mr. Bright had a number of solutions. The Exposition offered many more.

Even Coffee Beans

A conventional flow chart is the start, Mr. Bright suggested. Of even greater importance but probably much less known, is the travel chart. In the travel chart, as in a work simplification chart, you must take apart the job and find out what makes it tick, find out where the big problems are in your plant as it stands.

Here is how the manufacturers with young ideas are cracking the bottlenecks posed by old buildings: One of the main problems is a cluster of older buildings having different floor levels and all housing different manufacturing operations for the same manufacturer. One solution, connect the buildings by overhead pneumatic conveyors to handle bulk raw materials. This has even been done with coffee beans.

The garment trade has produced one innovation that metalworking men are eyeing with increasing favor. Connect one building with another with automatic dispatch monorail systems. Overhead vehicular bridges between buildings is another out. If two buildings are a few feet apart, several enterprising manufacturers have squeezed a needed elevator shaft between the two buildings, with openings on both sides of the shaft.

One producer mounted the elevator hoist in the taller building, hung the elevator shaft between the two, with doors in both ends of the elevator. Where ground floors are at slightly different levels, the problem has been met by building a dock across both buildings at a single level, with lift trucks running into the building on ramps from the dock or merely lifting raw materials from one level to another.

Another solution that has been tried and works: If you have narrow alleys between a group of buildings, roof over the alleys and make the cluster of small buildings into a single large one.

LIFT TRUCKS are widely used in materials handling to cut costs of intra-plant movement.

Vertical travel inside a single building is always a major problem. Suggested Mr. Bright: place the vertical conveyor outside the building if space is a problem. Using vertical chain conveyors and tray elevators, one manufacturer lowers his finished product, a 2-ton item, from a sixth floor onto railroad cars below.

Another suggestion that was confirmed by the considerable amount of radio communication equipment displayed at the Exposition this year—connect elevators, and the lift trucks they carry, by radio, and dispatch both from a central control point. As reported at the Exposition, one steel mill is now arranging to connect its soaking pits with its primary mills by radio-telephone.

Elevators are always a problem in an old building requiring considerable vertical travel. One machinery manufacturer is using two miles of chain conveyor in his building. Castings are hung on the chain directly as they come from the in-plant foundry with routing slips and spend their entire trip through the building dangling from a chain hook.

New Ideas Aplenty

Weak floors, a continual bugaboo in older multi-story buildings, are capable of at least some cure when the plant owner plans to begin moving lift trucks or tractor trains over them. They can be surfaced with one quarter inch steel plate to spread the load; or a subway grating can be laid and filled with concrete (1 in. grating has been used with considerable success).

Replacing wooden columns with

How To Improve Materials Handling

▪ The Materials Handling Exposition in Chicago generated a host of ideas for overcoming materials handling problems in industrial plants. Here are a few of them:

▪ Work out a simplification chart. Take the job apart and see what makes it go. Then plan the solution.

▪ You can connect one building with another with automatic dispatch monorail systems. Or, if two buildings are close together, consider placing an elevator shaft between them with doors on both sides.

▪ If you're cramped for space indoors, you might consider placing a vertical conveyor outside the building.

▪ Look into radio communication systems. Steel and other industries have been able to save time and money and increase efficiency with such systems.

▪ Got a weak floor problem that would make you hesitate to run lift trucks or tractor trains over them? This can be cured in several ways, including surfacing of the floor with steel plate to spread the load.

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new steel framing and floors is pretty much a rebuilding job, but has been done; bracing floors with additional steel pillars is simpler and is growing; or bolting steel plates around the old wood beams is good but calls for some tall load-bearing calculations by a man with considerable know-how.

For the manufacturer who has already begun tackling his plant modification problems and is now looking for new materials handling equipment for use in his plant, the Exposition was well stocked with new ideas.

One that was netting a considerable inquiry rate at the show was a vacuum lifting device by International Staple & Machine Co., that weighs 290 lb, will lift at least 2000 lb or more if engineered for the specific job. A battery of these devices has already been put to work lifting aircraft wings, stainless steel, and can be shaped to handle mill rolls.

Remote Control Trains

An application with considerable potential attraction for the plastics industry should be the use of these devices to handle the stainless steel, mirror finish rolls used in rolling large plastic sheets with rigid surface finish specifications. The rubber facing of the vacuum lifting unit prevents scratching. And one model equipped with its own motors mounted over the lifting pads, requires no airline, is completely self contained save for the electric power supply needed to operate the two pump motors. Despite the rubber sleeve which sustains the vacuum at the point of contact between the lifting head and whatever is being lifted, the unit can carry metals heated to 600°F. Other suggested uses: tank and ship fabrication, particularly on smaller hemispherical tank heads; castings, pipe, concrete pipe and products, paper cartons, ceramics, and barrels.

"I better go see what's holding him up."

Radio equipped tractors for in-plant trains, as well as yard cranes and lift trucks are gaining considerable strength, with one manufacturer now working closely with RCA to offer a small scooter that comes equipped with radio. Barrett-Cravens is offering a tractor for in-plant trains that is completely remote controlled, takes its route orders from an overhead wire, and can reverse and couple and uncouple its loaded cars automatically. Speed of travel can be controlled from the central control station.

Though applications described were chiefly in the food processing industry, this unit can be expected to appear in parts warehouses, and should be of interest to plants maintaining large stocks of dies. Impulses from the overhead wire are picked up by an "electronic brain" in the tractor. There is no direct connection.

Pallet Freight Problem

Four wheel drive and rubber tires continue to gain in the heavy mobile yard crane field. An interesting recent entry in this department is R. G. LeTourneau's 20-ton, 30-ft boom, mobile crane. The unit has a cargo platform, is rubber tired, capable of lifts up to 15 tons, and has four wheel drive with each wheel operating from an independent electric motor. Along with the advancing employment of four wheel drive, has come a considerable advance in the use of torque convertors and hydraulic couplings, another trend that crane users expect to see in increasing evidence.

Materials handling is having a strong market year. And it is evident that the increasing number of plant renovations will allow industry to make greater use of new materials handling equipment, with reduced operating costs the result.

MERGERS: Congress Takes Tough Look

FTC analysis starts probes in House and Senate . . . Commission is in for criticism for failure to act . . . Most mergers in manufacturing and mining industries . . . Automotive condoned—*By N. R. Regeimbal.*

• A FRESH round of antitrust investigations—aimed at dropping a few bombs among the big corporations—is about to start in Congress as a result of the Federal Trade Commission's recently completed analysis of the size, scope, and economic consequences of mergers in recent years.

Powerful Senate Judiciary Committee has already scheduled hearings on the antitrust aspects of mergers beginning June 1 at which various FTC officials, including Chairman Edward F. Howrey, will testify. In about a month, the House Small Business Committee will start its own probe of the Commission. In addition, the House Judiciary and Senate Small Business Committees are planning to collect testimony on the 200-page report.

FTC Criticized

Criticism of the FTC for an alleged failure to take any action on mergers in recent months—"why write reports if you don't file any cases?"—will develop from several quarters during the hearings.

FTC has created a special committee of staff members to study the report and prepare to investigate industries and firms which appear to be violating the antitrust laws on the basis of information collected in the study. Metalworking firms, especially fabricators, can expect to feel some repercussions of the study.

The report, which contains no recommendations, dwells particularly on recent merger activity in the manufacturing and mining industries. From 1948 to 1954, the report says, there were 1,773 combinations in this category alone. Some of the largest numbers of mergers in this period were in: non-electrical machinery industry with 249; chemicals, 168; fabricated metals, 161; transportation equipment, 125; electrical machinery, 111; mining, 81; and primary metals, 78, according to the report.

Especially signaled out in the study for discussion are mergers involving Follansbee Steel Corp.; U. S. Steel Corp.; Colorado Fuel and Iron Co.; Meritt-Chapman and Scott; Aluminum Company of America, and several others. The report does not comment on these mergers. But a statement accompanying the study says data in the report will provide Congress, the Justice Department, and FTC with "facts needed to determine what corrective action should be taken."

Auto Mergers OK

Also referred to in the report is the FTC complaint of last July against Luria Bros. & Co., in which it is alleged that planned acquisition by Luria of six other firms would tend to lessen competition.

Mergers recently in the automobile industry, however, are listed as examples of consolidations which should result in more effective competition in an industry.

List Reasons

FTC lists five reasons which seem to most often figure in mergers: additional capacity, accounting for two out of five acquisitions; diversification; vertical mergers looking toward sources of supply; vertical mergers looking toward ultimate sale to consumers; and additional capacity located in new markets. Scarce backlog funds is also a reason.

Who's Merging Most?

NO. OF MANUFACTURING AND MINING CONCERNS ACQUIRED BY INDUSTRY GROUPS, 1948-1954

INDUSTRY GROUP	NO. OF ACQUIRING CONCERNS	NO. OF CONCERNS ACQUIRED
Nonelectrical Machinery	166	249
Food & Kindred Products	100	243
Chemicals	73	168
Fabricated Metals	91	161
Transportation Equipment	66	125
Textiles & Apparel	74	117
Electrical Machinery	70	111
Non-Manufacturing	64	96
Mining	48	81
Primary Metals	53	78
Stone, Clay & Glass Products	39	70
Paper & Allied Products	42	60
Professional & Scientific Instruments	24	47
Lumber & Furniture	31	40
Petroleum & Coal Products	23	35
Printing & Publishing	15	24
Rubber Products	13	23
Leather Products	9	21
Miscellaneous Manufacturing	18	20
Tobacco Manufactures	4	4
TOTAL	1,023	1,773

RAILROADS: "New Look" for Next Year

Using lighter metals, ultra styling, new designs are aimed at boosting revenues, cutting costs . . . Roads invest millions in carbuilding programs . . . "Talgo" is among pacesetters—By *D. G. Picinich.*

◆ LIGHTWEIGHT METALS plus streamlined styling are playing twin roles in railroad car builders' trains for tomorrow.

ACF Industries, Inc., Berwick, Pa., is currently constructing two newly-designed Talgo trains for Chicago, Rock Island & Pacific RR and New York, New Haven & Hartford RR. Estimated cost of the units is between $750,000 to $1.2 million each. Operational flexibility, increased passenger comfort, and savings in initial investment and long-term maintenance are cited as prime advantages.

Estimated light weights for a complete 3-unit car range from 65,000 to 80,000 lbs, depending on material used and type of interior. Either a low-alloy, high-tensile steel structure or an LAHT underframe with an aluminum alloy superstructure can be used. Use of stainless steel for the exterior skin is also possible.

Weight per passenger for the 3-unit coach of the type slated for delivery late this year is between 700-800 lbs—less than half that of comparable conventional equipment.

SPLIT-LEVEL interior of PRR "tubular train" serves different height platforms, aids low center of gravity, allows safer high speeds on curves.

Safety and Speed

A significant feature of new car design, over that used in its predecessors operating in Spain, is operational flexibility. Each 3-unit car is completely reversible. Time-consuming multiple connections between cars have been eliminated.

Low center of gravity—18-in. lower than conventional equipment—adds to stability and riding comfort. Passengers are cradled between the wheels rather than swaying high above the rails. Guided axles allow for safer high speeds on curves.

New coaches can seat 84 passengers in rotating, reclining seats spaced at 42-in., or up to 96 passengers spaced at 36-in.

Floor height varies between 26-28 in. from the rail depending on load conditions. For high-level platforms, a Hi-Lo door can be built into the car which permits passengers to step up to or down from higher levels.

New equipment can be used in either "train" service, where a head end locomotive pulls a series of cars, or in "motor train" service where the locomotives are coupled at both ends of the line-up.

ACF estimates 3-unit Talgo coaches could be built on a quantity production basis for about half the cost of a standard 85 ft coach. Operational and maintenance costs, it's believed, would be about one fourth of comparable costs for conventional equipment.

Train "X," in production at Chicago Works of Pullman-Standard Car Mfg. Corp., is on order by two roads. New York Central RR and New York, New Haven & Hartford RR are slated to receive one 5-car unit each next spring. Costs are estimated at between $1.2-$1.5 million apiece.

Weighing about one-third as much as standard equipment, Train "X" is still in the experimental stage. Coaches have a 42-in. center of gravity with a 23-in. floor level above the rail. Power is supplied by a head end diesel locomotive. Guided axles, as in the Talgo train, permit safer high speeds in rounding curves.

Prototype of the current Train "X" model was launched in 1950. It's estimated that quantity production would cut costs by one third over cost of present equipment and save up to 50 pct in operational fuel bills.

The Budd Co., Philadelphia, has orders for its new-design lightweight stainless steel tubular train with two roads, PRR, NYNH&H.

CONSTRUCTION

EARTHMOVERS: Big Job Ahead

Non-Federal public construction alone should average $20 billion annually over next 10 years . . . Industry faces up to mammoth building challenge—By W. G. Patton.

AGAINST a backdrop of trail-blazing Pennsylvania Turnpike, Euclid's twin power tractor and scraper (inset) is helping build Indiana superhighway.

◆ THE DEPARTMENT of Commerce reports that over the next 10 years non-Federal public construction alone should average $20 billion annually just to keep pace with estimated needs.

The estimate is based on a survey by the Business and Defense Services Administration and covers all privately owned hospitals, educational buildings, and water and sewerage facilities, as well as all State and locally owned projects except residential buildings.

During the "very excellent" year of 1954 construction put in place for these type projects was worth $8.6 billion, according to BDSA's report.

The report points up the mammoth job confronting builders of earthmoving equipment in the immediate future, since non-Federal public construction requirements are only part of the picture. The industry is facing up to the challenge.

C. G. A. Rosen, president of the Society of Automotive Engineers and consultant, Caterpillar Tractor Co., told a recent SAE conference on earthmoving equipment:

"The earthmoving industry intends to take full advantage of new developments in materials and manufacturing techniques. It has often occurred that old failures have been built into new successes because of application of advanced knowledge and improved materials."

Industry Looks Ahead

The industry is looking closely at gas turbines and atomic energy; it is watching an attempt to put high pressure, high temperature steam to work in a modern tractor.

Power in the earthmoving field has increased in a few years from 150 to 400 hp. Yardage capacity of moving equipment has increased in even greater proportion. It is conceivable that powerplants up to 1000 hp may be needed to move even larger vehicles, traveling much faster over steeper grades.

A twin power Euclid tractor and scraper totaling 875 hp is at work on the Indiana turnpike construction.

Work with the special equipment is being watched by construction men with great interest. Three sections of the project were successfully bid by Western Contracting Corp. of Sioux City, Ia., on the basis of using the new powerful equipment.

Steel:

Youngstown breaks ground for tin mill at Indiana Harbor.

Last week J. L. Mauthe, president of Youngstown Sheet & Tube Co., broke ground for a new tin mill at the company's Indiana Harbor works, and reaffirmed earlier statements that Youngstown will continue to expand its steelmaking operations in the Chicago area, in what it regards as one of the nation's strongest steel consuming markets.

In the past two years the Indiana Harbor Works has seen the advent of a new 300 tons per hr slabbing mill with complete auxiliary equipment, as well as the beginning production last year of a new cold reduced sheet mill rated at a maximum cold reduction speed of 3500 fpm.

Employ Up to 400

The tin mill, scheduled for completion in about 14 months, will consist of a cleaning and annealing building, temper mill and coil storage building, the electrolytic tinning line in its own building and an attached preparation line in a separate structure; three shear lines, assorting room, and warehouse and shipping building.

Total employment in the new installation will amount to between 300 and 400 employees.

Bombers:

Report of long-range Red jet stirs defense fears.

Present American defense barriers might be seriously tested, the Defense Dept. indicates, if the Russians choose to mount an attack with their new heavy jet bomber, sighted in small formations over Moscow recently.

Formerly considered a prototype aircraft not yet in the production stage, the heavy bomber is now believed by military intelligence to be comparable to the U. S. B-52. This would mean that the Reds have, in undisclosed quantity, a plane that can carry a sizable bomb load at speeds up to perhaps 600 mph.

Draws Sharp Comment

The range, if similar to that of the B-52, would be approximately 6000 miles, exclusive of the distance that could be added by air refueling. A turboprop bomber, also revealed as a new addition to the Soviet arsenal, is thought in some quarters to be earmarked for aerial refueling duties.

The announcement drew quick comment from Sen. Stuart Symington, D., Mo. He said it ran counter to previous Defense Dept. statements that Russia was concentrating on a defensive air force. New figures show "the Communists are ahead of us . . . in the most important part of an offensive air force," he said.

President Eisenhower came back at his press conference with a caution against sweeping conclusions based on fragmentary reports. He said he was not worried about the Russians seizing general command of the air.

Fear Fighters Too

Late developments in the Russian fighter field might also complicate the job of American intercontinental bomber units if war occurs between this country and the U. S. S. R. An all-weather Red fighter, designed to give added protection to Soviet target areas at night and in bad weather, has been identified.

BLAST SURVIVORS, corrugated metal sheds are buckled but upright after standing in 6800 ft zone during recent atomic tests.

NEW DIRECTOR of iron and steel division, Business & Defense Services Administration, is Thomas J. Moore, Jr., general manager of Brainard Steel Div., Sharon Steel.

Plan New Nuclear Sub

Atom-powered submarine strength of the Navy will be doubled by the mid-July launching of the *Seawolf* at Groton, Conn.

Second of the Navy's nuclear subs, the *Seawolf* will be launched by the Electric Boat Div. of General Dynamics Corp., which also built the first atom-propelled sub, the *Nautilus*. The new vessel has the latest type of power plant, an intermediate neutron energy reactor with liquid metal coolant, produced by General Electric Co.

Like the *Nautilus*, the *Seawolf* is designed for an underwater speed of more than 20 knots and for extended undersea movement. Navy share of the cost of this second ship is figured at $32.7 million, compared with $29 million for the *Nautilus*.

The *Seawolf* has a higher cost, the Navy points out, because it is a 3260-ton vessel, while the *Nautilus* is 2980 tons. Cost of the power plants, computed separately, is about $25 million in each case.

Navy now has authority to build two more atomic subs and is asking authority for four more in the budget for the coming year.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Spares, airplane, $894,050, General Dynamics Corp., San Diego, Calif.

Spare parts, $370,000, A. C. Spark Plug Div., Flint, Mich., *L. R. Steffan.*

Generators, $288,854, General Electric Co., West Lynn, Mass.

Generators, aircraft, 224, $843,699, Bendix Aviation Corp., Eatontown, N. J.

Depot overhaul spare parts, 19, $57,689, Morse Instrument Co., Hudson, O.

Motor-generators, $902,401 American Machine and Foundry Co., Dayton, O.

Microphone, 57250 ea, $278,123, Automatic Mfg Co., Newark, N. J.

Dry batteries, 3370 ea, $647,021, General Dry Batteries, Inc., Lakewood, O.

Electron tube, 299540 ea, $404,379, Tung Sol Electric, Inc., Newark, N. J.

Radio transmitting, 37 ea, $2,609,397, Collins Radio Co., Cedar Rapids, Iowa.

EXPANSION IN INDUSTRY

Aluminum:

Alcoa launches $10 million facilities program in Iowa.

Construction will begin shortly on a $10 million installation at Aluminum Co. of America's Davenport Works to house plate stretcher equipment leased to the company by the Air Force.

Scheduled for completion in about 18 mos., the new facilities are the fourth major plant development in 3 years.

Capable of exerting a two-way pull of 16 million lbs, the new equipment will enable the company to produce heavy, heat treated aluminum plate in large sizes. To supplement the $6 million Air Force project, the company will construct installations to house supporting facilities such as cranes, power distribution systems and other services at a cost of more than $4 million.

Required for high performance aircraft, plate will be turned out in widths up to 144 in., lengths up to 60 ft and thicknesses up to 6 in. The new installation also will include a heat treatment furnace, quenching and handling facilities and a 60 ft aging furnace.

Develops Coast Plants

Elgin National Watch Co., Elgin, Ill., is creating an electronics division to operate three plants acquired in the Los Angeles area during the past 6 months. Output of the added facilities is expected to exceed $5 million in sales this year.

Newly acquired installations include Advance Electric & Relay Co., Burbank; Elgin-Neomatic, Inc., Los Angeles, and American Microphone Co., Pasadena.

The West Coast facilities will turn out relays for military, commercial and industrial application. It is estimated that relays constitute an $80 million a year industry, their use having doubled in the past 10 years because of more complicated circuits in military, commercial and industrial devices.

Add Soaking Facility

Republic Steel Corp. will start work this month on a new block of soaking pits at its Buffalo plant. Cost of the project is estimated at $800,000.

It is expected that the new facility will add another heat per day to the blooming mill capacity.

Each of the new pits will be able to heat at one time 14 steel ingots weighing approximately 6 tons each.

Construct Bar Mill

Atlantic Steel Co., Atlanta, has broken ground for a new $8.5 million merchant bar and rod mill.

The new facility is the first phase of a modernization program currently underway.

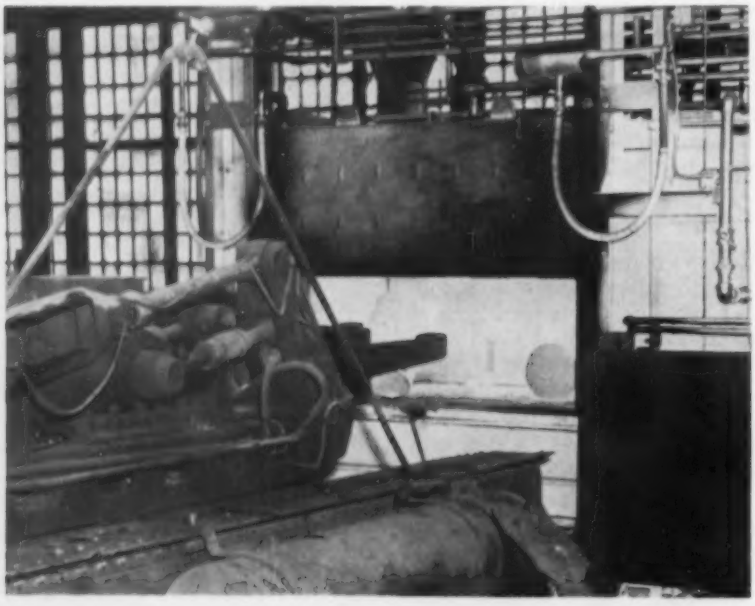
New equipment will be housed in a 740 ft x 100 ft installation. Two warehouses attached to the main building will occupy an additional 52,000 sq ft of space. Mill operation is slated to begin Sept., 1956.

Sign 2-Way Agreement

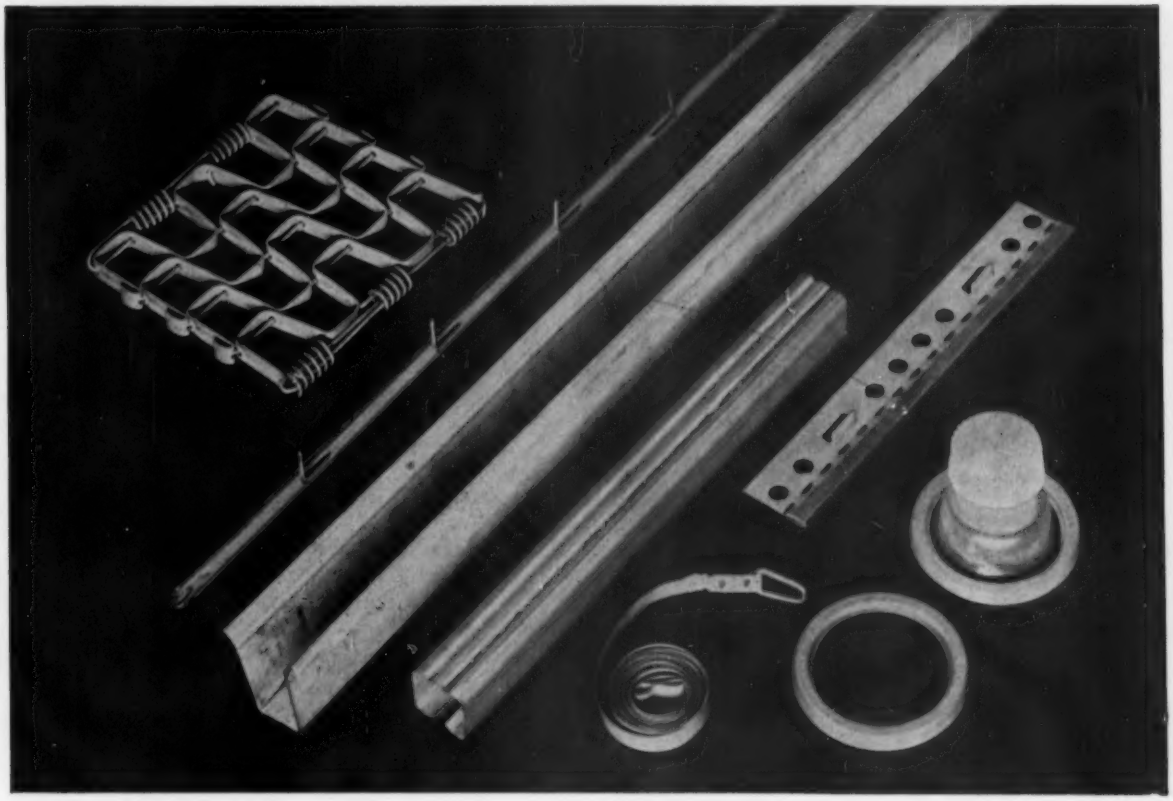
Union Carbide & Carbon Corp.'s Electro Metallurgical Div. will purchase titanium tetrachloride for Electromet's titanium sponge plant, now under construction at Ashtabula, Ohio, from Columbia-Southern Chemical Corp.

The liquid chemical, to be used as feed material for the new facility, will be produced at Columbia-Southern's new plant under construction at Natrium, W. Va.

FIRST hot steel ingot emerges from new continuous heating furnace at Standard Steel Works, Baldwin-Lima-Hamilton Corp. 700 lb ingots can be heated to 2100°F in 2½ hours.



• BRAINARD ELECTRO-GALVANIZED STEEL



How to provide parts with a BUILT-IN PROTECTIVE COATING—at low cost!

Specify Brainard electro-galvanized steel when parts require protection against rust and corrosion . . . you eliminate the coating operation. This pre-coated steel eliminates expensive plating and finishing . . . improves product life and appearance.

The galvanized coating — an integral part of the metal—protects both inside and outside of formed and drawn parts . . . is not affected by forming operations. Coating is hard and uniform, with thickness controlled within .0002.

If your parts require such protection, it will pay you to investigate. Let Brainard quote on your requirements.

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(Advertisement)

AN IMPORTANT MESSAGE CONCERNING...

A Basic Advance In Motor Insulation

ELECTRIC motor and generator insulation has come in for its share of announcements of "new" and "revolutionary" developments. But in spite of these announcements, inherent shortcomings of conventional insulation have remained.

There has been little basic improvement in motor insulating systems . . . UNTIL NOW.

Allis-Chalmers, working with engineers and scientists of Dow Corning Corporation, has developed *Silco-Flex* motor insulation . . . truly new in concept . . . truly new in effectiveness.

The *Silco-Flex* insulation system employs a pure silicone rubber combined with specially developed application techniques to produce an insulation unmatched by any other in use today. Outstanding improvements are shown in all these important characteristics:

Homogeneity — The complete *Silco-Flex* coil insulation is vulcanized into a single piece with no joints, voids or splices which can develop into breaks in the insulation. Even the best of the new conventional insulations combine several dissimilar materials which are held together by binders.

Heat Resistance — The excellent dielectric and mechanical properties in silicone rubber do not change significantly with aging at high temperatures over long periods of time.

Moisture Resistance — Completely sealed, *Silco-Flex* insulated coils are the most moisture-resistant coils ever produced.

Chemical Inertness — *Silco-Flex* insulation has outstanding resistance to most atmospheric contaminants, corona and weathering. It also withstands weak acids, alkalies and lubricants.

Flexibility and Resilience — *Silco-Flex* insulation remains flexible and resilient indefinitely under operating conditions. It is especially resistant to mechanical abuse and to the stresses brought about by overloading and rapid starting and stopping. It is also amazingly resistant to abrasion.

Heat Dissipation — Most electric insulators, unfortunately, are also heat insulators. *Silco-Flex* insulation, by comparison, is an excellent heat conductor and materially assists in removing heat from the coils.

What Are the Benefits?

The characteristics of this new insulation are so remarkable that complete reappraisal of motor application practices and motor performance is indicated.

In *all* applications, the chemical, mechanical and electrical properties of *Silco-Flex* insulation insure increased service reliability and longer life.

In addition, this new insulation system may reduce or eliminate the need for special motor enclosures. Atmospheres contaminated with cinders and fly ash, for instance, will have little effect on *Silco-Flex* insulated windings. Similarly, abrasive dusts in steel mills will not harm this insulation. Savings through the use of open, instead of totally-enclosed, frames will also be possible in chemical, paper, food and other industries where water or corrosive atmospheres are a problem.

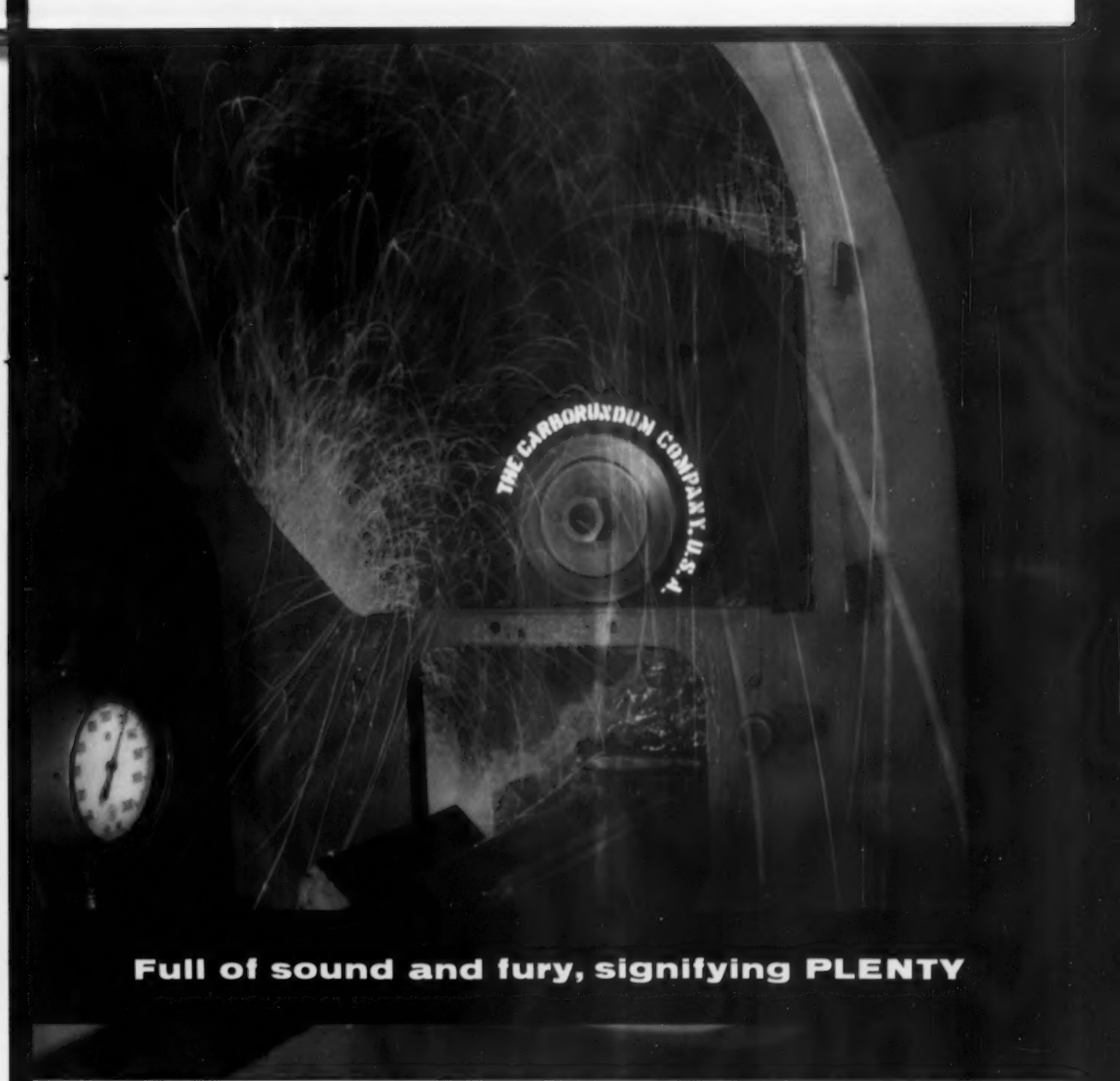
What About Availability?

New *Silco-Flex* insulation is immediately available for all Class H form-wound coils and for Class A and B windings. operating under selected service conditions.

For complete information on* SILCO-FLEX *insulated motors, see your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4664

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS



Full of sound and fury, signifying PLENTY

7,700-s.f.p.m. wheel speed is "stopped" by 1/10,000 sec. stroboscopic exposure. (Wheel guard opened and coolant flow reduced to reveal cutting action.)

The *right* Abrasive Cut-Off Wheel by CARBORUNDUM will slice through metal in seconds... 12 to 20 times faster than a power hacksaw. You get clean, accurate cuts, without extra deburring and smoothing needed after shearing or flame-cutting. For wet cutting, to extremely close tolerances, use Rubber Bond Wheels...for dry cutting at high speeds, use Resinoid Bond. Tough CARBOFLEX Reinforced Wheels are tops for all portable cutting and slotting—combine fast action with maximum safety. Your CARBORUNDUM Distributor or salesman knows how to help you use abrasive cutting, profitably, in your shop. Call him today. For free Booklet #6, "Metallic Cutting Off," write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

"SAND SCREEN's" unique open-mesh construction lets removed material flow *right through*...instead of loading or glazing, like conventional paper and cloth. What's more, *both* sides are usable—give you 7 to 15 times longer life. Use "SAND SCREEN" wet or dry, by hand or machine. It tears and folds easily to any desired size. Cut sheets fit oscillating or vibrating machines. "SAND SCREEN" Discs give best results when used wet with CARBORUNDUM's FASTCUT® Pad 85 Assembly. Try it—see how it slashes polishing and finishing costs in your shop. For a free sample, call your CARBORUNDUM Distributor or salesman, or write The Carborundum Company, Niagara Falls, N. Y. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ont.

Through product quality and application "know-how"

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

Report To Management

The Crisis Is at Hand

Critical point in the economic year will occur within a very few weeks. Strike possibilities and other major market factors will be determined possibly within days. At the end of June, even before, 1955's profile on graphs and charts will be determined.

This is no time to lose confidence or place bets on the negative side. Market and labor critical points will be surmounted with little or no difficulty and the remainder of the year will reflect the boom pattern of the first half.

No auto strike theory still holds up as deadlines approach. In spite of strike votes, rumors of no progress, and the like, realism will prevail. The guaranteed annual wage concept will be translated into terms of cost and settled in that manner.

Steel labor problems are not as critical, although the steelworkers' idea of what constitutes a "substantial" pay increase is out of line. There may be somewhat more difficulty in reaching a settlement than first predicted, but nothing alarming is in sight.

Strikes or not, the market for most consumer and heavy goods is also approaching the point where the curve can turn down or keep its upward trend into the second half.

The market is still strong for automobiles, appliances, home building, farm equipment, and other products. There will not be a sharp summer drop in consumer buying. Inventories, although high, are not alarming and in many cases are necessary to give customers the wide choice they expect. A drop in consumer buying just isn't in the cards.

Don't Let Credit Buying Scare You

Although installment buying is high, higher than any point in history in some fields, there is no cause for alarm.

Delinquent payments are at their lowest point for some types of goods and repossessions are almost unheard of. Delinquencies in auto credit are less than 0.5 pct, even lower for other consumer items.

Buyers haven't dipped into their cash reserves to make all the purchases that have resulted in the present economic boom. This means they will be back next year for a dryer to go with the automatic washer, a new television set, or even a later model car.

Government Reports Prove It

Federal Reserve Board's industrial production index hit 136 in April, just one point lower than the all-time record set in 1953, when almost every other production record was set.

Steel, automotive, and nonferrous share in the upswing which should equal or surpass the 137 mark at some time during the summer months.

Gross national product hit a near-record annual rate of $370 billion in the first 3 months of this year while industrial activity was climbing. It is well above that now.

Retail sales also climbed to $15.5 billion in April, 1 pct above March and 7 pct over a year ago, according to U. S. Dept. of Commerce figures.

Keep Up With Basic Trends

Don't neglect basic factors in evaluating your plans for expansion and market development. Fundamentals such as population trends, changes in buying habits, increases in spending capacity, all have importance in your long range planning.

They can easily be neglected because of their gradual rate of change compared with quick success of special, new products. But in the long run, they will determine your direction of business growth.

INDUSTRIAL BRIEFS

Aluminum Contracts . . . Kaiser Aluminum & Chemical Corp. awarded the following contracts in connection with its new aluminum sheet and foil rolling mill at Ravenswood, W. Va.

Graver Tank and Manufacturing Co., Inc., East Chicago, Ind., for elevated aluminum water storage tanks. Nichols Wire & Aluminum Co., Davenport, Iowa, for 8600 ft of aluminum chain link fencing fabric and 26,000 ft of aluminum barbed wire. Cyclone Fence Dept., American Steel & Wire Div., U. S. Steel Corp., for aluminum fence posts, fittings and gates. Acme Construction Co., Solon, O., for 6000 ft of railway trackage.

More Offices . . . Metal & Thermit Corp. will erect a new general office building at Woodbridge, N. J., adjacent to the company's Woodbridge Research Laboratory. Executives' offices will remain in New York.

Buys Company . . . Southco Div., South Chester Corp., Lester, Pa., has purchased the working assets of Lion Fastener, Inc., Honeoye Falls, N. Y. The acquisition further diversifies the company's line of industrial fastening devices.

Purchasing Offices . . . Purchasing headquarters for the Vanadium Corp. of America have been opened at the company's executive offices, 420 Lexington Ave., New York.

Transfers Operations . . . Transfer from Pittsburgh to Kalamazoo, Mich., of general office departments of Ruud Mfg. Co. will be completed by July 1. Movement of headquarters and personnel to the new office building has been accomplished over the past 6 months.

Cold Extrusion . . . Mullins Manufacturing Corp. has completed installation of equipment to produce projectiles by its Koldflo process at the Naval Industrial Reserve Ordnance Plant at Hays, Pa. Equipment and dies are being proved and production routines established. Then it is anticipated the plant will go into stand-by status.

Adds Division . . . Formation of a new major manufacturing division embracing four of the company's plants in Indiana was announced by Chrysler Corp. Designated as the Supply Div. of Chrysler, the division consists of the company's present plants in Indianapolis, New Castle, and Kokomo, plus a new automatic transmission plant under construction at Kokomo.

Increases Lines . . . American Pulley Co. of Philadelphia has purchased assets of Safeway Industrial Equipment Corp., Chicago, manufacturer of manually and electrically operated hydraulic lift trucks. The trucks will be merchandised under the trade name of "American Safeway."

Grinding Methods . . . A Grinding Methods Laboratory at the Mattison Machine Works, Rockford, Ill., offers a new service in which manufacturers submit parts for sample grinds, production estimates, wheel recommendations and other production requirements.

Expands . . . Crusher Engineering, a new division of Poor & Co., will be established in Philadelphia. The division will make a complete line of jaw and roll crushers, hammermills, impact breakers, Bradford breakers and pulverizers for industrial markets.

To our Favorite Boss!

From the receptionist at the front door through to the last man on the loading platform—*all* of us here at Great Lakes Steel have a very important *something* in common. It is the knowledge that your continued and expanded need for our products determines the future and growth of every one of us, regardless of our individual jobs here.

It is the knowledge that *you*, Mr. Customer, are the boss!

That's why we at Great Lakes are seeing to it that our steel is the kind you have a right to expect from a specialist in flat-rolled products. We know the importance of prompt shipments, top quality, proper packaging and loading, dependable information, and clerical accuracy. We think you'll agree that our many satisfied customers are a pretty good indication that this policy is good business for all concerned.

Next time you have a problem in steel, call on one of our representatives to help you solve it. You'll be glad you did!

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Ecorse, Detroit 29, Mich. • A Unit of
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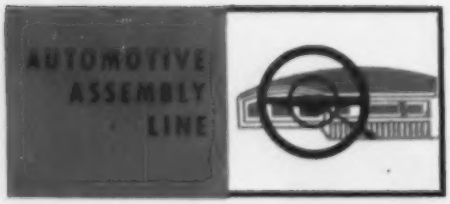


Power Race Requires Better Brakes

New developments seek better heat dissipation . . . Speed and high power strain current brake systems . . . Ford revises model designation on Continental . . . Production records in sight—By *T. L. Carry.*

◆ RECENT MECHANICAL improvements in today's automobiles have increased the need for better braking systems in the industry. The increase in an engine's horsepower, for example, makes it possible and sometimes desirable for a car to reach high speeds in a shorter time.

But it is also equally important to be able to stop the car in just as short a space. Today's brakes are capable of performing this task extremely well but not over an extended period of time. Continuous fast starts and quick stops build up a great deal of heat in the brake drum and cause it to expand. The more stops that are made, the more foot pressure is required to stop the car. This condition does not prevail under normal driving procedures, however.

Be that as it may, heat dissipation is the biggest problem facing brake engineers today. Automobile brakes are energy converters. A car is stopped by using friction to overcome motion. This is the cause of the heat generation.

Brake Developments . . . One suggested method of reducing heat is the use of vents on wheel rims thus allowing air to circulate around the brake. In a test run by the Chrysler Corp. at Pike's Peak, cars made runs down the mountain with their brakes dragging. The temperature of the brake shoes on the car equipped with vented wheels was 80° less than the car with standard brakes.

With this in mind, the Budd Co. has developed a new type cross-rib brake drum with a flared flange which, the company says, has heat dissipating qualities far superior to those found in a standard brake drum.

Another possible solution to the heat problem is the design of an entirely new type of brake. Disc brakes are admittedly superior to any type of drum brake as far as heat dissipating is concerned. This is possible because distortion due to high temperature does not effect the contact pattern between the friction surfaces. Also there is no drum expansion and corresponding loss of pedal reserve. Disc brakes, however, cost much more than standard drum brakes.

Until the cost can be reduced, improvements will first be made in the standard drum brake. Among the goals being sought are better lining and drum materials, and standardization of brake fluid with a high boiling point.

"Popular with whom?"

Mark II Continental . . . The new automobile to be introduced later this year by the Continental Div. of Ford Motor Co. will not be identified, as was the practice in the past, with the year in which it was made. Instead the new car is to be designated the Continental Mark II.

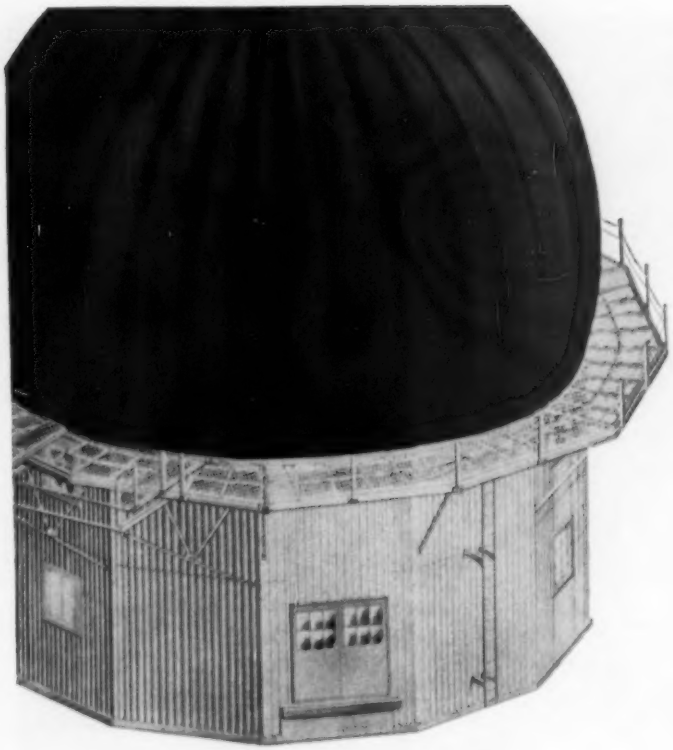
The new designation was announced by William C. Ford, general manager of the Continental Div. The term is based on the assumption that the Lincoln Continental produced from 1940-48 constituted the Continental Mark I series. The Mark II series will be redesignated the Mark III when the next major body change is made.

Mr. Ford says the new term will emphasize the basic body design of the Continental rather than a model of any particular year.

Chrysler Realigns . . . Reorganization plans, already paying dividends in the company's remarkable comeback this year, will be accomplished in integration of the Nine-Mile press plant in Detroit.

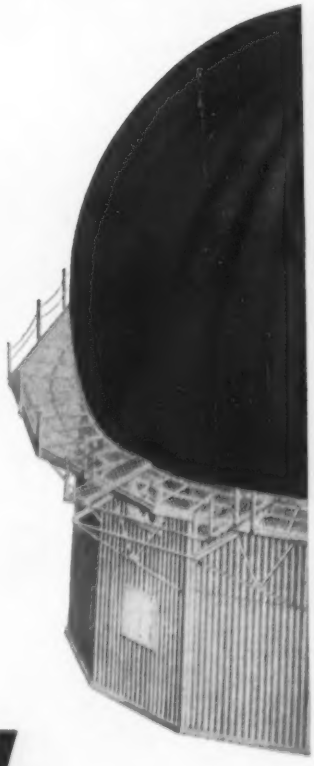
Formerly operated by the Dodge Div., the huge stamping facility has been realigned under the Auto Body Div. to affect closer coordination between the fabrication and assembly of body parts for the divisions and build-up of automotive bodies for Plymouth.

The ABD originally was the former Briggs Body facilities purchased by Chrysler a year ago. Since that time, many other manufacturing operations have been assigned to the division. The Nine Mile plant supplied body stamp-



ON GUARD above the Arctic Circle, Air Force radar station features flexible neoprene-and-fiberglass dome which pulsates to dislodge ice and snow.

Radar dome shrugs off 100-mph gales at sentry post on roof of the world!



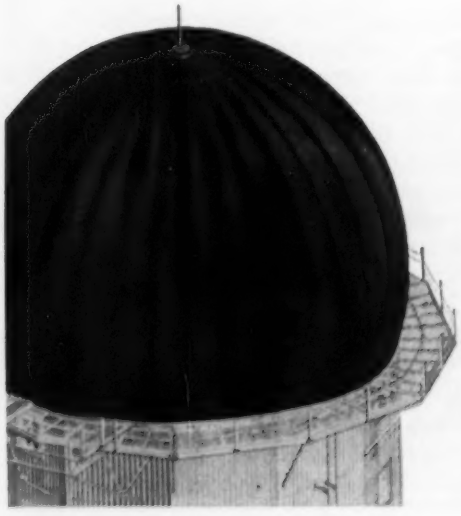
RB&W bolts hold tight on critical fastening job

You'll never read a headline about RB&W bolts and nuts in U. S. Air Force radar domes strung across the top of the world. But the men who build the odd-shaped structures—Dresser-Ideco Co. of Columbus, O.—know that their ability to withstand the cruelest weather on earth stems largely from these work-a-day fasteners.

C. Daniell Byrd, Dresser-Ideco's sales promotion manager, puts it in these words:

"Keynote of our planning is rugged construction. RB&W bolts offer superior size and dimensional stability. Since the parts *must* fit, RB&W's consistent product uniformity adds an essential 'plus' to the strength and performance of these bolts."

Maybe your product doesn't have to withstand 100-mph Arctic blasts. Wherever it's used, however, it will do a better job for a longer time if you put it together with RB&W fasteners. We'll be glad to show you how. RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N. Y. 4.12



RB&W

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110 Years Making Strong the Things That Make America Strong

Plants at: PORT CHESTER, N. Y.; CORAOPOLIS, PA.; ROCK FALLS, ILL.; LOS ANGELES, CALIF. *Additional sales offices at:* ARDMORE (PHILA.), PA.; PITTSBURGH; DETROIT; CHICAGO; DALLAS; SAN FRANCISCO. *Sales agents at:* NEW ORLEANS, DENVER, SEATTLE. *Distributors from coast to coast.*

...naturally it's

AMERICAN MONORAIL

This American MonoRail Monotractor unit, recently installed in a rug and carpet warehouse, dispatches hard to handle, big bulky loads over a wide area. Fully automatic, with finger-tip control, with a hoist capacity of 1,000 pounds, this installation is SAVING 200 MAN HOURS PER WEEK.

This is another of the many examples of American MonoRail engineering for low-cost, efficient overhead handling. Let your American MonoRail representative explain the versatility, low cost and low maintenance of American MonoRail equipment. Consultation in connection with any handling problem is available without obligation.

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
May 21, 1955	186,754*	33,643*
May 14, 1955	187,956	33,790
May 22, 1954	134,363	23,660
May 15, 1954	129,590	24,206

*Estimated Source: *Ward's Reports*

ings and assemblies to all passenger car and truck divisions.

The move follows integration of Chrysler's Indiana plants into a separate parts division.

Production:

Big Three sets sights on all time marks.

If company claims are any indication, 1955 is going to be the biggest automotive production and sales year in the history of the industry. In a recent speech on the West Coast, George W. Troost, vice-president of the Chrysler Corp., said the firm is presently building cars at the rate of more than 30,000 a week, more than double last year's rate.

"During the first 4½ months of this year," Mr. Troost said, "we sold 688,453 passenger cars and trucks, compared to 350,566 during the same period last year." He said Chrysler's share of the total U. S. retail automobile market for this period has risen to 18½ pct of the industry's expanded total as compared to less than 13 pct of the passenger car market for all of last year. Chrysler, Mr. Troost said, has set as its initial goal this year 20 pct of the market.

All Agree . . . Harlow H. Curtice, president of General Motors Corp., likewise announced new sales and production records. Up to May 10, Mr. Curtice said, domestic sales of new Pontiacs, Chevrolets, Oldsmobiles, Buicks and Cadillacs totalled 1,353,714, the highest total in the company's history for this period and 143 pct higher than the figure for the same period last year. All five of GM's passenger car divisions recorded new highs for the period.

Mr. Curtice said the record sales are "impressive evidence of the continuing and accelerating strength of the automobile market and reflect the vitality of the entire national economy."

The Ford and Mercury Divs. of the Ford Motor Co. also report record sales for the January-April period this year. Although the two divisions didn't quote any figures, Ford says its sales for the first four months of 1955 are higher than any other similar period since 1924 and 22 pct higher than last year. Mercury Div. says its sales are 25 pct higher than the first four-month period in 1954.

Providing that there are no major interruptions such as a strike, the records are going to fall with a bang this year.

Buyer Profits

Restricting competition in the automobile business might aid those in a weak competitive position but in the long run it would penalize the consumer, according to Henry Ford II, president of Ford Motor Co.

In the two years since the return to the automobile buyer's market, Ford has thrived on competition, he said. But the man who benefits the most is the consumer. Because of competition, automakers and all other businessmen are constantly seeking new ways to improve their products and services and at the same time give the customer more value for his money, Mr. Ford added.

Electrostatic Paint

Studebaker has installed electrostatic spray painting in coating chassis for its complete line of passenger cars.

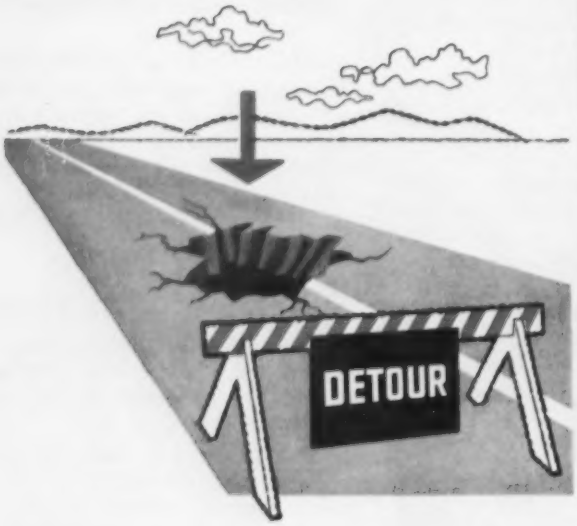
The process was installed as a basic step in the division's new production methods program aimed at improving work standards in the South Bend, Ind., plant.

Studebaker was using electrospray in applying prime coats to bodies and had experience with the process in advance of the new installation. The Ransburg No. 2 process used on the chassis cut paint consumption from 15 drums of paint per day to 1½ drums, while increasing the hourly production rate of chassis by 10 pct.

HERE, QUICK! A TEASPOON OF THIS WILL CLEAR THAT RIGHT UP!
LET THIS LITTLE PILL DISSOLVE ON YOUR TONGUE AND IT'LL SNAP YOU RIGHT OUT OF IT!
HERE, TWO OF THESE WILL STOP THAT DIZZY SPELL AT ONCE!
TH' BOYS NEVER LET ONE GET TH' BEST OF THE OTHER IN DOIN' A FAVOR FOR TH' OLD MAN, DO THEY?
YEH, AND HE'LL TAKE ALL O' THEM, AND ALL THAT'S WRONG IS THUMB MARKS ON HIS GLASSES! HE'S BEEN CURED O' EVERYTHING WITH THEM GLASSES!
THE POCKET DOCTORS
5-27
J.R.WILLIAMS

THE BULL OF THE WOODS

By J. R. Williams



a hole here wastes time . . .

a hole here saves time

Crucible Hollow Tool Steel Bars save time — and money too — whenever you need ring-shaped steel parts, or tools with a center hole. The tool steel is drilled through when you get it! You don't need to bore, drill, hole-saw, cut off or rough-face. That's why they cut your production time, increase machine capacity — and reduce scrap losses.

You can get these hollow bars in any of Crucible's famous quality tool steels, in almost any combination of OD and ID sizes. And you can get *immediate* delivery of five popular grades — KETOS oil-hardening; SANDERSON water-hardening; AIRDI 150 high carbon, high chromium; AIRKOOL air-hardening; and NU DIE V hot-work tool steels — from the Crucible warehouse near you.

Call your Crucible representative for the full story of how these steels can save time and money in your shop. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

THIS WEEK IN WASHINGTON

Are Defense Profits Running Wild?

Democrats assail "fantastic profits," start secret probe . . . Move marks stepped-up search for political issues . . . Charges are baseless but Air Force supports added safeguards—By G. H. Baker.

◆ DEMOCRATS in Congress are getting ready to juice up their campaign of sniping at the Eisenhower Administration. New line of attack: Defense Sec. Wilson is "permitting" defense contractors to ring up "fantastic profits."

The truth of the matter is, of course, that Charlie Wilson is permitting no such thing, but House Democrats in particular are under instructions to Speaker Sam Rayburn to bang away at Ike's Administration from every conceivable angle in the hope of developing a few hot, sticky issues calculated to springboard a Democrat into the White House in 1957.

As a result, many Democrats are dutifully assailing "jet propelled" profits in defense contracts. The House Appropriations Committee, for example, has hired special investigators to look into all contracts that suggest "excessive" profits. The probers are working in secret at this point, and will not disclose what they find nor what remedies for blocking "raids on the Treasury" they may have in mind for some months to come.

Say It Isn't So . . . Air Force bosses assure Congress that the contracts they draw up leave no opportunity for any firm to reap "excessive" profits. But they ask for enactment of a new renegotiation law anyway, as an additional safeguard.

The Senate is considering a House-passed bill permitting the Army, Navy, Air Force, and other buyers of military supplies to renegotiate all government contracts. The old renegotiation law expired last December. Proposals now being debated would make renegotiation authority retroactive back to Jan. 1 of this year and extending through 1956.

Nearly all contractors and subcontractors have a high sense of responsibility, the Senate was told last week by Air Force Asst. Sec. Roger Lewis. Contractors have been known to "just walk in and hand over some money if they think they made too much," he reports.

Push Helicopters . . . Latest Navy flying development: Helicopters operated by remote control. Quantity procurement still is over the horizon, however. Naval aviators are experimenting with a prototype to learn what the pilotless "eggbeater" can do in the way of take-offs, landings, and in flight forward, backward, sideward, and hovering.

Kaman Aircraft Corp., Bloomfield, Conn., built the prototype now being tested. If the military is satisfied with performance of the model now being tested, some sizeable orders should be in the works soon.

Naval aviators are trying out another Kaman idea: Small electric light bulbs housed in transparent plastic covers at the end of each rotor blade on helicopters. This is an aid to other aircraft and helps in night-formation flying of helicopters.

Controls Move Closer . . . "Stabilized economy" advisers have convinced President Eisenhower that standby control authority is a necessary tool in the emergency package. As things stand now, the Administration will ask Congress early in June for permission to operate an all-out control program in an emergency.

If authority is granted, controls

Air Plane Plans

▪ How to size up the volume of future aircraft orders: Air Force, Navy, and Marine Corps are planning on 36,000 active aircraft by July 1, 1956. (Today, the total is just under 35,000.) At the beginning of this year, the AF had 121 fully activated combat wings. It plans to have 131 by this time next year, and 137 by 1957. Nearly all AF wings are now equipped with modern aircraft, and all fighters are now jet-propelled.

"I feel like a King,

When I do Business with Lamson & Sessions!"

"Maybe I'm not one of Lamson's biggest customers. In fact I'm sure my business is "small potatoes" compared with some.

But small as it is I get a full measure of the "velvet carpet" treatment whenever I call upon them—either to place an order or just ask for some help on a fastener problem.

Come to think of it that's probably why Lamson pops into my mind first when I need bolts and nuts. With the rush of business nowadays it makes you feel good all over to do business with a company with a heart."

Guess you can say they mix business with pleasure. That's a good combination for my money!"

YOU GET MORE WHEN YOU BUY FROM . . .

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might be invoked if war erupted, or possibly if inflation became serious enough to endanger the country's war-potential, although the latter possibility is slight.

Under present planning, here's what controls would mean:

Prices and trade-in allowances would be frozen, with some increases permitted later; weekly or hourly wage rates, but not total earnings, would be controlled and increases permitted; credit controls would set down payments and limit repayment terms for consumers; rationing would control business inventories as well as consumer purchases.

Controls sentiment in Congress has been neutral, so that if the Administration makes a strong plea, broad standby authority might be granted. This would mean an ever-present danger that this form of government control could again be imposed.

Grant Fast Tax Aid

Certificates of necessity for fast tax amortization for 63 new or expanded facilities costing $94.2 million have been approved by the Office of Defense Mobilization.

ODM has granted U. S. Steel a certificate to write off 40 pct of the $8.5 million cost of electrolytic tinplate facilities at Gary, Ind. Other large certificates went to Texas Gas Transmission Corp., Owensboro, Ky., 25 pct of $18.1 million for natural gas transmission facilities, and Northern Pacific Railway Co., St. Paul, Minn., 55 pct of $6.1 million for railroad diesel locomotives.

Also in the latest group of certificates, Jones & Laughlin Steel Corp., Pittsburgh, Pa., is permitted to write off 50 pct of $1,057,500 for steel plant facilities.

Offer Atomic Heat

Industrial, public, and cooperative users of heat energy may offer their bids now for nuclear heat produced in experimental running of a sodium graphite reactor being built near Los Angeles.

Development work on the Sodium Reactor Experiment (SRE) project is being performed by North American Aviation, Inc., under contract with Atomic Energy Commission. The same firm will operate the plant when it is completed next year.

Peak heat load of the SRE will be about 20,000 kw, permitting approximately 7500 kw of electricity to be generated. Availability of heat will depend upon the demands of the experimental program.

Proposals to buy the heat must be sent not later than June 13 to the AEC San Francisco Operations Office, 518 17th St., Oakland, Calif. One proposal already received is from Southern California Edison.

Stockpile:

Over half the minimum quotas will be met by June.

Government stockpile officials hope to fill six more minimum goals in the next 12 months, bringing the mobilization inventory to more than 50 pct complete.

As of this June 30, the government will have 39 of its 75 goals accomplished and nine others 75 pct or more filled. In a year, there will be 45 goals filled and 17 more at least 75 pct complete.

Minimum objectives of many 75 pct items can be "substantially acquired" over the next 2 or 3 years, the Office of Defense Mobilization says in its semiannual report to Congress.

ODM is operating two stockpiles, the so-called short term or minimum inventory—basic needs for mobilization—and the newer, long-term stockpile in which the government buys stocks of minerals and materials as a means of aiding depressed but critical industries, such as lead and zinc.

Estimated value of the long-term stockpile is $3.1 billion, of which about $1 billion is on hand or under contract. Much of the balance is accounted for by materials that are currently in short supply for the minimum program.

In the 6 months ending last Dec. 31, some $650 million worth of stockpile materials in excess of minimum objectives were purchased for the long-term stockpile, and $154 million in new purchases were made. About $64 million of this was open market purchases, chiefly of lead, zinc, and metallurgical manganese.

Total stockpile program, both minimum and long-term, amounts to $9.6 billion, of which $4.9 is on hand; $600 million on order, and $4.1 billion yet to be acquired. Shortages, dollarwise, in the program of $4.1 billion are equally split between the two goals.

"I'd like to have you meet our sales manager and our controller."

Broaden Tax Relief

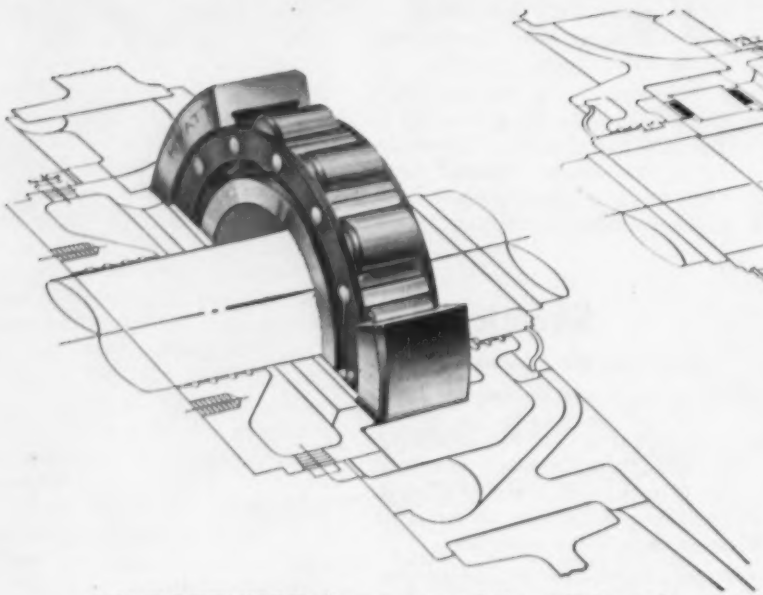
Effective June 1 Armed Services Procurement Regulation will permit defense contractors whose plants were fully or partially built after Dec. 31, 1953, to employ computing methods offered in the Internal Revenue Code of 1954.

The declining-balance method, for example, is one of the approved ways of getting a better depreciation allowance during the first few years of plant or equipment life. An allowance so figured can be important to holders of cost-reimbursement-type contracts, the only type immediately affected by the new policy.

Depreciation claimed under the new policy will be allowed if it is reasonable and can be allocated to performance of defense contracts. It must be acceptable for tax purposes in order to be approved by military contracting officials.

How Hy-Loads can help you . . .

OVERCOME OVERLOADING



HY POTENUSE, the sage of the slide rule, says:

This HYATT Hy-Load is heading for a long hard life. It's been designed into as tough a job as you can hand any bearing—the armature shaft of a steel mill motor.

These HYATT Bearings must maintain the armature on centers with very close running clearance despite the fact that *steel mill motors are frequently overloaded and are regularly reversed under full load!*

But ability to "take it" isn't the only reason leading motor builders mount HYATTS on both ends of armature shafts: the offset of the flanged inner race provides vital *inbuilt, non-adjustable free end float*, permitting the armature to center itself electrically. What's more, HYATT'S *separable and interchangeable* races facilitate quick replacement of armatures.

See why so many smart designers agree? *You can't go awry when you specify—*

YOUR COMPLETE LINE
OF CYLINDRICAL ROLLER BEARINGS

HYATT

STRAIGHT | BARREL | TAPER

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

ROLLER BEARINGS

Growth Forces West Steel Expansion

Change from distribution to manufacturing economy makes West production minded . . . Steel production lags behind national pattern . . . No aircraft reduction expected . . . Convair expands—By *R. R. Kay.*

◆ WESTERN STEEL executives in the long-range thinking department of their companies should gird themselves for some brave expansion moves in the next several decades.

For the western states are in for fantastic population increases that will far outstrip the rest of the nation. And the economy of this part of the country will have to keep pace with the projected growth.

By 1975 some 38 million people will be living in the West—an increase of more than 70 pct over our present population. By the year 2000 that figure will swell to something like 60 million, or 28 pct of the country's people.

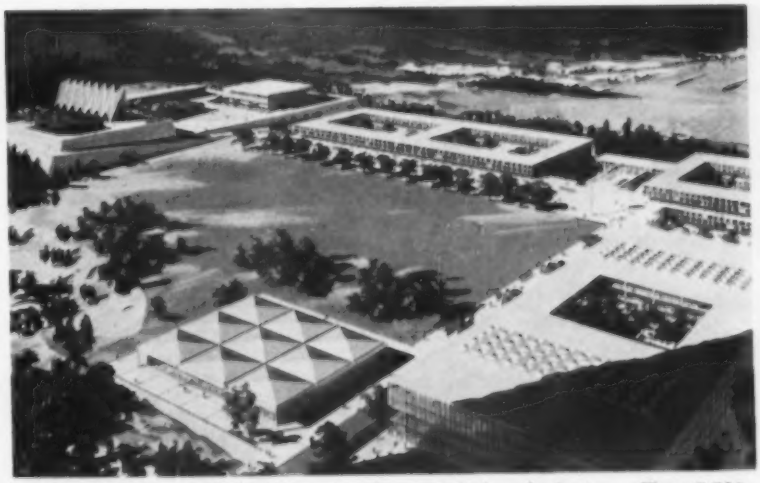
The West, which now has about 15 pct of U. S. population, has every reason "to expect an increase in economic activity during the next 20 or 25 years in excess of 90-100 pct of the present situation—and probably much higher."

Therefore, industrialists are advised "to view their specific interests in light of the present and projected position."

This prediction comes from Dr. Weldon B. Gibson, director of Stanford (Calif.) Research Institute's economics research division.

Industrial Laggards . . . In a talk to the Pacific Coast Electrical Assn. in San Francisco the research specialist pinpointed several segments of the West's industrial economy which are conspicuous laggards in this region's swift growth.

Pig iron capacity in the West is only about 5 pct of national output. Steel ingot capacity, about 6 pct.



Architect's concept of Air Force Academy at Colorado Springs. The 17,500-acre site is at the foot of the Rocky's Rampart Range.

These figures become more significant, he suggested, when you consider that "more and more eastern as well as western manufacturers are producing in the West for the local market—and indeed for shipment to eastern markets."

In short, the West has changed "from a distributive to a manufacturing economy."

Because the West's population and economic growth are slated to outpace the nation's as a whole, "productivity goals in the West will require more than the usual vigilance and planning."

Airforce Contracts Secure . . . Air Force Secretary Talbott, at the Colorado Springs, Colo., unveiling of scale models and plans for the $126-million Air Force Academy, told THE IRON AGE the Air Force has no intention of decreasing the amount of contracts, activity, or employment on the West Coast. He said again that the plants now in production will continue busy. The government's policy aims only at dispersing future expansion of aircraft production facilities—there's no intention to break up the industry already established here, Mr. Talbott insisted. Existing plants are not threatened.

Convair Expanding . . . THE IRON AGE has information that Convair, San Diego, will add 4000-5000 workers to its payroll by next winter. The F-102 production program at Plant 2 is getting under way at full steam. Aircraft employment in the San Diego area levelled off at about 34,000, down 6.8 pct from a year ago. Current level is the lowest since end of 1951.

Now See the Entire Collection of "Award-Winning" Kling Metal Fabricating Machines in this New Bulletin 100

In the new Kling Bulletin you will find illustrations and data representing over 50 Kling Machines. These versatile machines, performing scores of metal-working operations, are winning "Production Oscars" for thousands of companies throughout the world. It is the increased production . . . labor-saving . . . cost-cutting results from Kling machines that account for their increasing use in "the best of companies." Such results as shown here* can be yours. We will be glad to send you a list of users in your industry, along with your free copy of the new Complete Line Bulletin 100. Why not send for it today?

A **KLING DOUBLE ANGLE SHEARS** *One Chicago manufacturer reports that this machine is cutting his labor costs 75%

B **COMBINATION SHEAR, PUNCH & COPERS** *A large railroad shop reports that this "jack-of-all-jobs" gets 16 hours' work from an 8-hour shift

C **HIGH SPEED FRICTION SAWS** *A famous midwest manufacturer reports that one of these saws cuts 1000 to 1300 channels, angles, round and flat bars, every 8-hour day

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Makers of Friction Saws; Shears—Rotary, Double Angle and Guillotine; Punches; Combination Shear, Punch and Coper; Angle and Plate Bending Rolls; Bulldozers.

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MACHINE TOOL HIGH SPOTS

What Automakers Want in Machines

General Motors mechanics ask greater standardization, easier maintenance . . . Survey lists wide range of performance needs . . . War tooling calls for interchangeable parts—By *E. J. Egan, Jr.*

◆ MACHINE tool builders recently heard some straight talk on what General Motors Corp. expects from the metalworking equipment it buys. GM management aim is to produce better parts at lower cost. To do this it needs ultra-reliable machine tools that will (1) work faster, (2) maintain closer tolerances, (3) not be so expensive as to make the lower cost goal unattainable.

These general requirements were submitted to builders at their recent spring meeting by R. J. Emmert, executive in charge of GM's Facilities and Processes Staff.

Mr. Emmert followed his discussion of management objectives with a detailed summary of specific machine tool improvements. His list of most-wanted items was compiled from results of a questionnaire circulated among GM master mechanics.

Cut Care Cost . . . For drilling equipment, 34 pct of the survey recommendations called for any improvements to reduce maintenance. Better drilling accuracy showed up on 27 pct of the replies; greater flexibility and operating ease scored 21 pct; and 9 pct of the suggestions mentioned provisions for greater operator safety.

Other specific requests for drilling machine improvements called for more rigidity, more positive depth control and better spindle lubrication.

Drilling machine standardization got into the act, too. Most prevalent suggestion was for a standard spindle nose for attaching multiple heads. For power drilling units, standardization is deemed desirable for mounting bases, attaching holes and the dimension of base to spindle.

Want Rigid Mills . . . Specific suggestions for improving milling machines included greater rigidity and strength; centralized lubrication system; better chip disposal; larger spindle nose; higher spindle speeds; greater spindle horsepower (provided more rigidity accompanies it); improved spindle and feed drive to reduce chatter; chip protection on moving parts, bearings and ways; and elimination of lubrication leaks.

As for milling machine standardization, most prevalent suggestion from the master mechanics was for uniform T-slot locations in tables.

"The way I figure it the company has another of those top secret machine contracts."

The same poll also suggested that builders of turning machines give consideration to those elements that affect: (1) operating cycles and work quality, (2) maintenance, (3) stocking and service requirements.

Tell Turner Needs . . . Specifically, the master mechanics want turning machines that are fast, powerful and rigid enough to permit optimum use of carbide turning tools. They want better chip handling and coolant cleaning devices; less coolant splash and overflow; better centralized lubrication with positive coolant seals.

Lathe builders also learned that they might check up on ways to: (1) improve alignment of indexing mechanisms and turrets; (2) increase safety features by eliminating loose wrenches and adding guard-mounting bosses; (3) add clearance for accessories and tool setting. They heard that better accessibility to high-maintenance components might suggest quick-change couplings.

Stress Standard Parts . . . For tooling interchangeability among various makes of turning equipment, GM engineers and production men would like builders to standardize tool mounting, work spindle pilots, spindle noses, collet shapes, work head and tail stock center tapers, and center distances from slides to spindles.

About the many suggestions for machine tool standardization, Mr. Emmert told builders, "Please let me emphasize that we have no desire to limit your ingenuity or freedom to work out new designs."

Q. Why does Blanchard grind its own machine parts on a Blanchard?

A. It's the only way we know to get highest quality at lowest cost!

Shown here are 117 different parts of a #18 Blanchard Grinder. 239 surfaces on these 117 parts were ground on a Blanchard, for the simple reason that *there isn't any better way.*

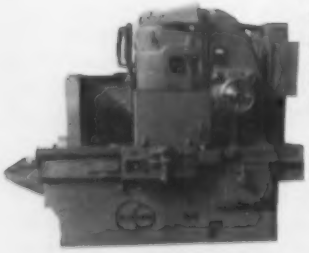
Everyone who uses Blanchard Grinders knows that Blanchard elements are machined with extreme accuracy . . . that they *have to be!*

Furthermore, Blanchard users everywhere would undoubtedly agree fully with these two actual statements recently made by customers:

"There is no greater machine tool money value than a Blanchard. It is the best buy we ever made".

"Until our Blanchard went to work, I never realized I could actually save so much, as compared to previous methods of machining flat surfaces".

If you do not own a Blanchard, we invite you to select some of your own components, and let us give you estimates to compare with your present quality control tolerances and machining costs. Chances are you'll find it will pay you to **"PUT IT ON THE BLANCHARD".**



P. S. You guarantee yourself full benefit from your Blanchard Grinders when you use the correct Blanchard abrasive wheels!

Send for free copies of "Work Done on the Blanchard", (fourth edition), and "The Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

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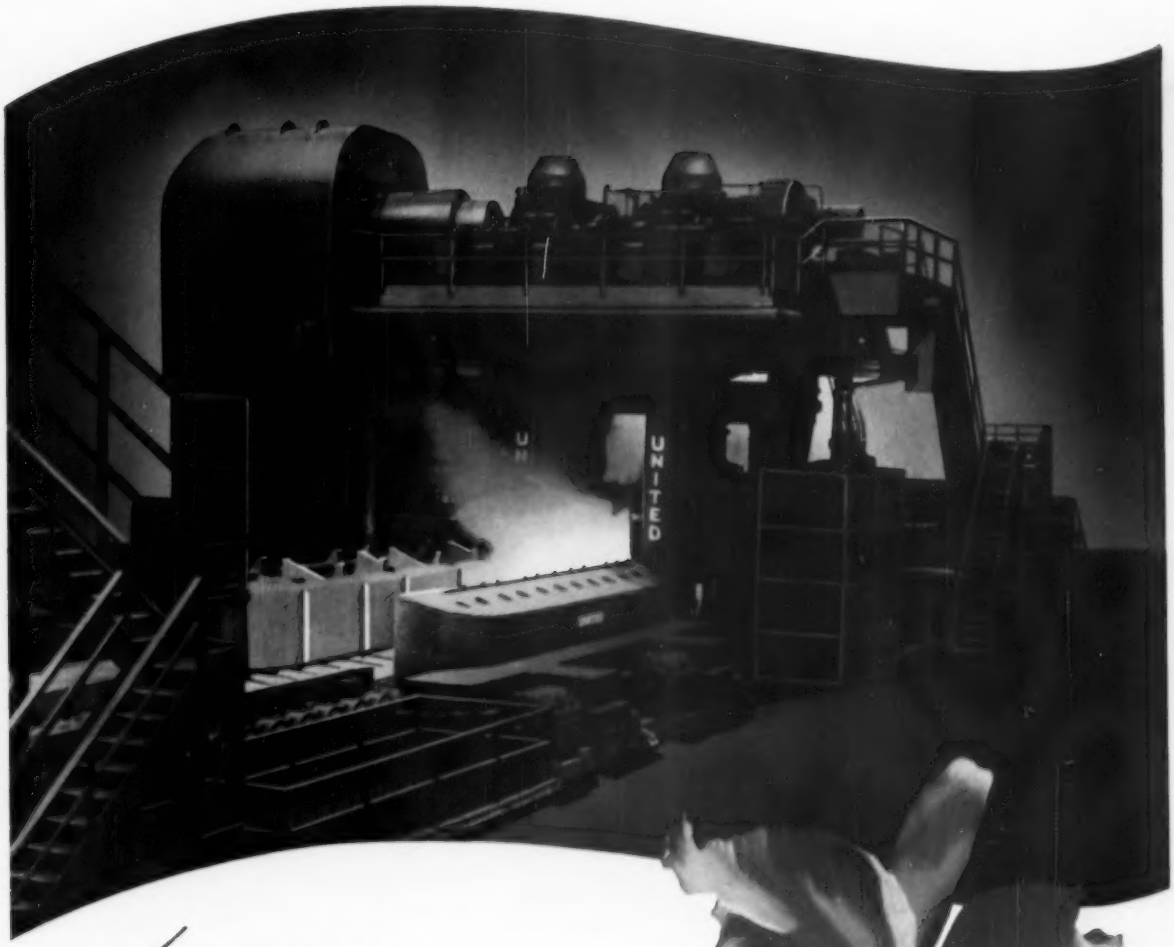

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45" Reversing Slabbing Mill which has broken all world records by rolling 214,842 net slab tons in one month.

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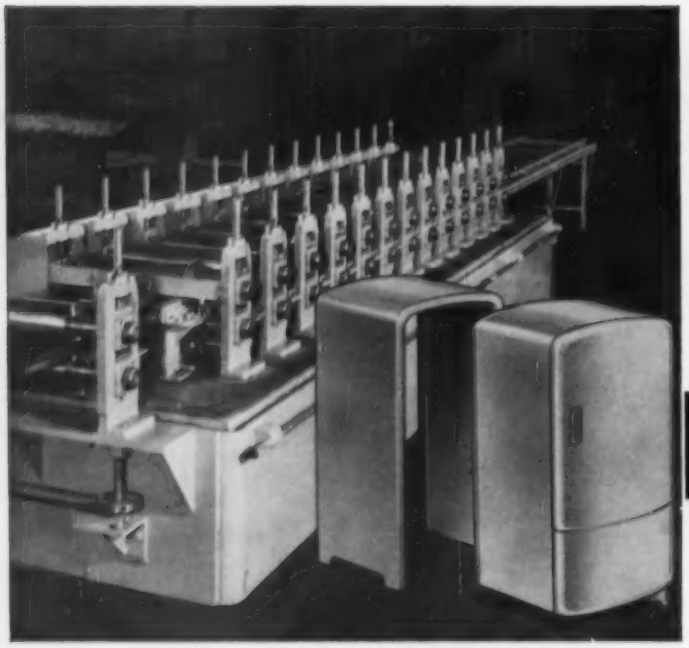

Refrigerator shells now being made almost exclusively in Yoder Cold Roll Forming machines, from flat sheets forming sides and top.

In autos, buses and railroad coaches, cold roll formed mouldings and panels serve many purposes, both inside and out.

Cold Roll Formed components enter extensively into this Stransteel home and many other factory-built structures.

1001 things now being done by

COLD-ROLL-FORMING

Especially if your business has grown from modest beginnings to sizable volume, it is time to take a fresh look at the economic and other possibilities of cold roll forming.

The modern cry for streamlined design and automation is admirably met by Yoder Cold Roll Forming equipment. Things are being done today by this process which yesterday were not thought possible. Take refrigerator cabinets, for example: Nearly all of them are now formed in one passage through a Yoder machine from a flat sheet which is then transversely bent, as illustrated, to make the top and the sides.

Likewise in autos, buses and railroad coaches, roll-formed shapes are extensively used both inside and outside, for combination decorative and functional mouldings and panels.

Homes, storage and warehouses, industrial, retail and wholesale structures are most economically fabricated and erected largely from cold roll formed shapes.

The above are but a few of the many end uses for roll formed sections which are illustrated in the Yoder C.R.F. Book—with explanatory text on the machines, the art, end uses and economics of cold roll forming. A copy is yours for the asking.

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★ **COLD-ROLL-FORMING and auxiliary machinery**
★ **GANG SLITTING LINES for Coils and Sheets**
★ **PIPE and TUBE MILLS—cold forming and welding**

The Iron Age

SALUTES

Robert F. Mehl **A brilliant metallurgist with both feet on the ground, he has added to the knowledge of scientists and uncovered facts vital to our military and industrial strength.**

Director of the metals research laboratory at Carnegie Institute of Technology, Robert F. Mehl recently took time off to do an oil painting. Subject was a micrograph. After 30 years intense concentration on metallurgy, Dr. Mehl eats, sleeps and even paints metal structures.

This deep interest has yielded important advances in our knowledge and use of metals. Dr. Mehl is a leading educator who still teaches graduates and undergraduates at Carnegie Tech. But it is his research work that has really rung the bell.

He pioneered gamma-ray radiography for nondestructive testing of metals. His study of gun steels has been called the "most important contribution to gun tube manufacture" of the last war. Numerous papers on metallic structure and action have won him honors on three continents. Regular calls from industry and government testify to his reputation as a sound, practical metallurgist with a grasp of everyday problems.

Dr. Mehl was born in Lancaster, Pa., in 1898. He studied chemistry at Franklin and Marshall College, graduating in 1919 and going on to advanced work at Princeton. In 1923 he went to Juniata College as head of the chemistry department. A research fellowship brought him to Harvard in 1925.

From 1927 to 1931 he did metallurgical research for the Navy. He spent 2 years with American Rolling Mill Co., then came to Carnegie Tech in 1932 to assume research and teaching duties. In 1953 he was named Dean of Graduate Studies at the Institute.

Dr. Mehl is a serious man, absorbed in metallurgy but maintaining broad interests within the field. He has translated foreign texts, given a helping hand to South American countries, addressed British and Swedish scientific bodies. He is a profound scientist but he keeps both his teaching and his research in close touch with practical needs. At 58 he is dark haired and fit and eager for more metallurgy.

Principal plant of Dutch State Mines whose processes for producing NH_3 from coke oven gas are now available in equipment manufactured by Air Products, Incorporated.

NOW-Convert Coke Oven Gas to NH_3

BY TIME TESTED METHODS

Air Products, Incorporated, has concluded an exclusive arrangement with Dutch State Mines of Holland for the exchange of technical know-how in the purification of coke oven gas to produce synthetic ammonia.

Dutch State Mines is one of the world's principal manufacturers of synthetic ammonia from coke oven gas. It is prominent internationally for its activities in designing, building and operating low-temperature processing equipment for this purpose.

Air Products, for many years, has constructed units for many types of gas separations. These include refinery gases, reformed gas streams, and others for the production of ammonia synthesis gas. The design of Air Products equipment for the low-temperature purification of coke oven gas is based upon American chemical engineering practices and also takes advantage of the process design and operating experience which has been developed over a period of 25 years in the laboratories and operating plants of the Dutch State Mines.

LOW COST OXYGEN...NITROGEN

Air Products
INCORPORATED

Dept. I, Box 538, Allentown, Pa.

The Iron Age INTRODUCES

GEORGE W. WALKER, elected vice president and director of styling, Ford Motor Co., a newly established position.

McClure Kelly, elected president, **Baldwin - Lima - Hamilton Corp.,** Eddystone, Pa.

Frank Lang, Jr., appointed resident plant manager, Brooks Equipment & Mfg. Co., a subsidiary of **Borg-Warner Corp.**

H. L. Zuinn, elected treasurer and W. H. Worrilow, Jr., elected vice president—sales, **Lebanon Steel Foundry,** Lebanon, Pa.

H. S. Schaufus, appointed chief metallurgical engineer, **Vanadium Co. of America.**

A. J. Kreiner, appointed chief engineer, accessory engineering div., **Marquardt Aircraft Co.,** Van Nuys, Calif.

D. W. Pehl, appointed assistant superintendent—mechanical shop, **Kaiser Steel Corp.,** Fontana, Calif.

D. W. Saladin, named assistant general superintendent, Christy Park works, National Tube Div., **U. S. Steel Corp.**

W. L. Kaiser, appointed industrial engineer, **Wheeling Steel Corp.**

W. A. Yost, Jr., appointed to the newly created post of vice-president, staff operations, **Allis-Chalmers Mfg. Co.**

Ralph W. Burk, elected executive vice-president, **Kearney & Trecker Corp.,** Milwaukee, and **Raymond L. Bischoff,** elected financial vice-president.

H. W. Witt, elected field engineer—Seattle area, Aeronautical Div., **Robertshaw-Fulton Controls Co.**

G. L. Berry, named chief engineer, **J. & L. Steel Corp.,** Pittsburgh. **Charles de Carlo,** promoted to assistant treasurer.

E. L. Mackey, promoted to director of engineering, **Yoder Co.,** Cleveland.

Lloyd Oliver, named supervisor, mining sales, Carmet Div., **Allegheny Ludlum Steel Corp.**

Hugh Bunten, elected secretary **Signode Steel Strapping Co.,** Chicago.

H. R. Nelson, appointed chief research engineer, Research and Technology Div., **U. S. Steel Corp.**

J. C. Doyle, named general sales and marketing manager, **Ford Motor Co.,** Special Products Div., and **J. B. Lackey,** appointed divisional controller.

Robert Diefendorf, elected treasurer, **Aluminum Industries, Inc.,** Cincinnati.

Harold B. Emerick, named director, Technical Services Div., **Jones & Laughlin Steel Corp.,** Pittsburgh.

Ralph A. Creter, appointed plant metallurgist, Union Drawn Steel Div., **Republic Steel Corp.,** Beaver Falls, Pa.

EDWARD B. WILBER, elected treasurer, Aluminum Company of America, N. Y.

ALFRED T. BLACKBURN, elected vice president-sales, Cincinnati Milling and Grinding Machines, Inc.

E. D. VANCIL, elected director-sales, Cincinnati Milling and Grinding Machines, Inc.

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Albert A. Albright, appointed assistant manager, Marine Sales Section, **Cooper-Bessemer Corp.,** Mount Vernon, Ohio. **Dwight R. Craig,** appointed administrative assistant, Engineering Dept.

C. D. Howe, appointed manager —sales, San Francisco district, **Bethlehem Pacific Steel Corp.**

Alexander Zeitlin, elected vice-president, **Birdsboro Steel Foundry & Machine Co.,** Birdsboro, Pa.

Edward E. Bauer, appointed manager—d c aluminum electrolytic plant, **General Electric Corp.,** Irmo, S. Carolina.

Clarence H. Smith, appointed Studebaker works manager, South Bend and Los Angeles plants, **Studebaker-Packard Corp.**

Farnsworth L. Jennings, appointed director, Law Department, **Union Carbide and Carbon Corp.**

Howard W. Hoppe, named manager of tax, Audit and Procedures, **Inland Steel Products Co.**

J. T. Black, appointed general superintendent, Connors Steel Div., **H. K. Porter Co., Inc.,** New York.

William E. Liesman, appointed assistant sales manager, Parish Pressed Steel Div., **Dana Corporation,** Toledo.

John F. Robb and **Vernon H. Patterson,** appointed to executive positions in the sales department, **Climax Molybdenum Co.,** New York.

W. Roy Willard, appointed assistant to the president, **Buffalo Steel Corp.,** Tonawanda, N. Y.

Donald J. Harrington, appointed manager — marketing, Appliance Control Department, **General Electric.**

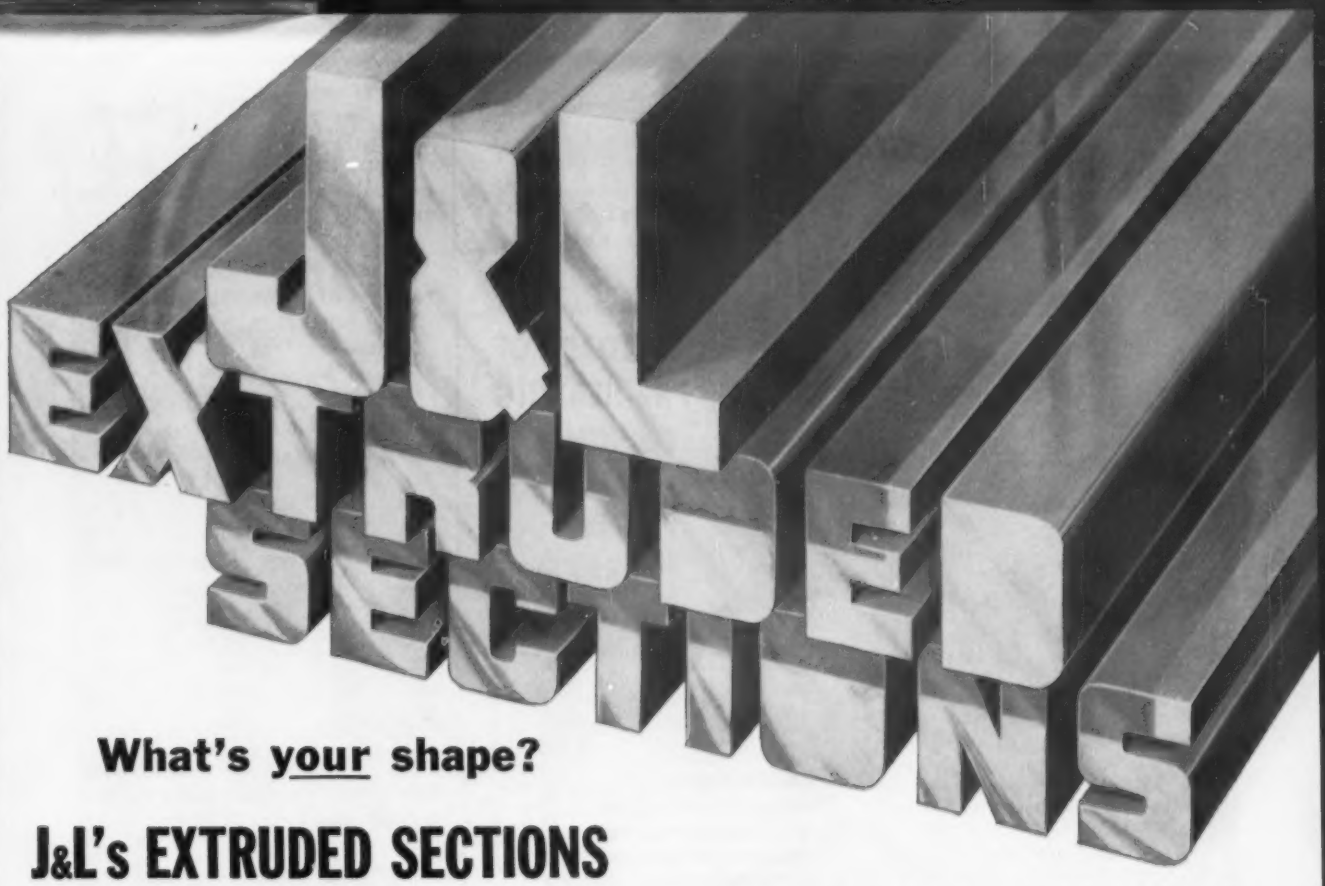
Dr. E. H. Seymour, appointed chief engineer, **Thermal Research & Engineering Corp.**

DONALD L. ROSSITER, appointed vice president and general manager-sales, Inland Steel Products Company, Milwaukee.

DONALD H. CAMPBELL, elected vice president and treasurer, Rigidized Metals Corporation, Buffalo.

A. M. CLEAVELAND, appointed manager of works, American Steel & Wire Div., U. S. Steel.

GORDON A. PAUL, appointed manager of general accounting dealing with manufacture and sale, American Steel & Wire Div., U. S. Steel Corporation.



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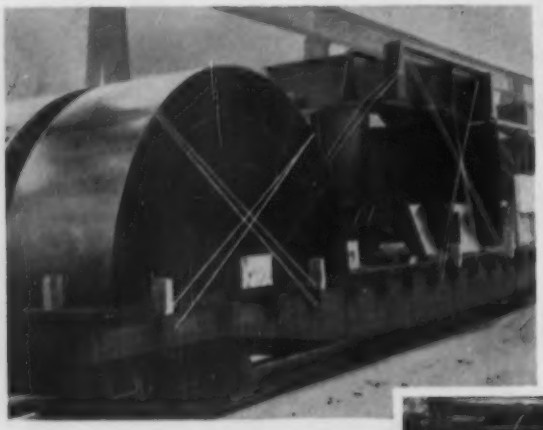
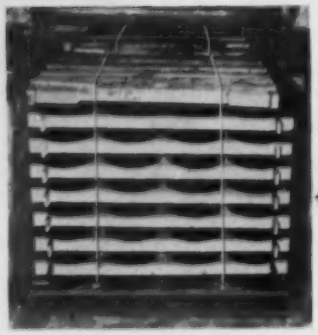


CARLOADS OF PRE-HEATING EQUIPMENT TO PALLETS OF BRAKE DRUMS



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PERSONNEL

Henry R. Merrill, appointed general sales manager, Behr-Manning Div., **Norton Company.**

Robert E. Dobson, appointed manager of marketing—special accounts, portable appliances, **Westinghouse.**

Dr. B. T. Collins, appointed product development engineer, Wabash Div., **Raybestos-Manhattan.**

William D. Heavner, Jr., joined the research staff, Stainless Steel Research Section, **Allegheny Ludlum Steel Corp.**

Dr. Henry Carroll, nuclear physicist, has joined the research division of **Allis-Chalmers Corp.,** Milwaukee.

R. S. Moore, appointed general sales manager, **Harbison-Walker Refractories Co.,** Pittsburgh.

George Woodland, appointed general sales manager, Industrial Div., **Chain Belt Co.,** Milwaukee.

W. J. Athanson, elected executive vice-president, **National Automotive Fibres, Inc.,** Detroit.

J. D. Lee, manager — laundry equipment, Electric Appliance Div., **Westinghouse,** Mansfield, Ohio. **A. R. Campbell,** appointed area sales manager, Chicago. **J. J. Anderson,** manager—portable appliances, Electric Appliance Div. **C. H. Bartlett,** and **C. C. Shutt** elected vice-presidents.

OBITUARIES

Karl Landgrebe, vice president, Tennessee Coal & Iron Div., **U. S. Steel Corp.** at Birmingham, Ala.

Bennett M. Livezey, formerly general superintendent, South Chicago works, **United States Steel.**

A. T. Rogers, board chairman, **Rogers Galvanizing Co.,** Tulsa.

Henry E. Goeppel, vice president of **Detroit Power Screwdriver Co.,** Detroit.

Case No. 42

Kemp Immersion Heating Gets Top Results for Signode Steel Strapping Company

How Signode Steel Strapping Co. tempers 650 feet of steel strap every minute

At the Signode plant in Sparrows Point, Md., turning out up to a thousand miles of steel strap daily calls for fast, efficient production line techniques. One highly important phase in the final processing is the tempering bath. Here, Signode called on Kemp Engineers to supply the 15 ton, gas-operated Immersion Melting Pot shown above. Now steel strap is uniformly tempered at the rate of 650 feet per minute.

Kemp Offers More Advantages

By installing Kemp Immersion Heating, Signode benefits in many ways. Unlike underfired pots, Kemp pots are *not* subject to *periodic* and expensive shutdowns . . . won't crack or break. They operate *continuously* at maximum heating efficiency with a *substantial* savings in fuel costs. Offer a greater heating surface, faster heat recovery, lower dross formation, even lower room temperatures. At the same time, this Kemp unit enables Signode to eliminate costly temperature override and open flame fire hazards.

Let Kemp Solve Your Problems

These same advantages apply to all types of melting or heating operations. Whether you are engaged in tempering, annealing, descaling, coating, etc., you can rely on Kemp Immersion Heating. Why not find out how Kemp Engineers can help you, save you money?

This 10 ton oval pot is typical of the many Kemp installations now in use. Features Kemp Carburetor, part of all Kemp equipment, to deliver complete combustion . . . without waste . . . without tinkering. One-pipe air and fuel feed reduces installation costs, simplifies maintenance.

For more complete facts and technical information, write for Bulletin IE 11 to C. M. KEMP MFG.CO., 405 East Oliver St., Baltimore 2, Maryland.

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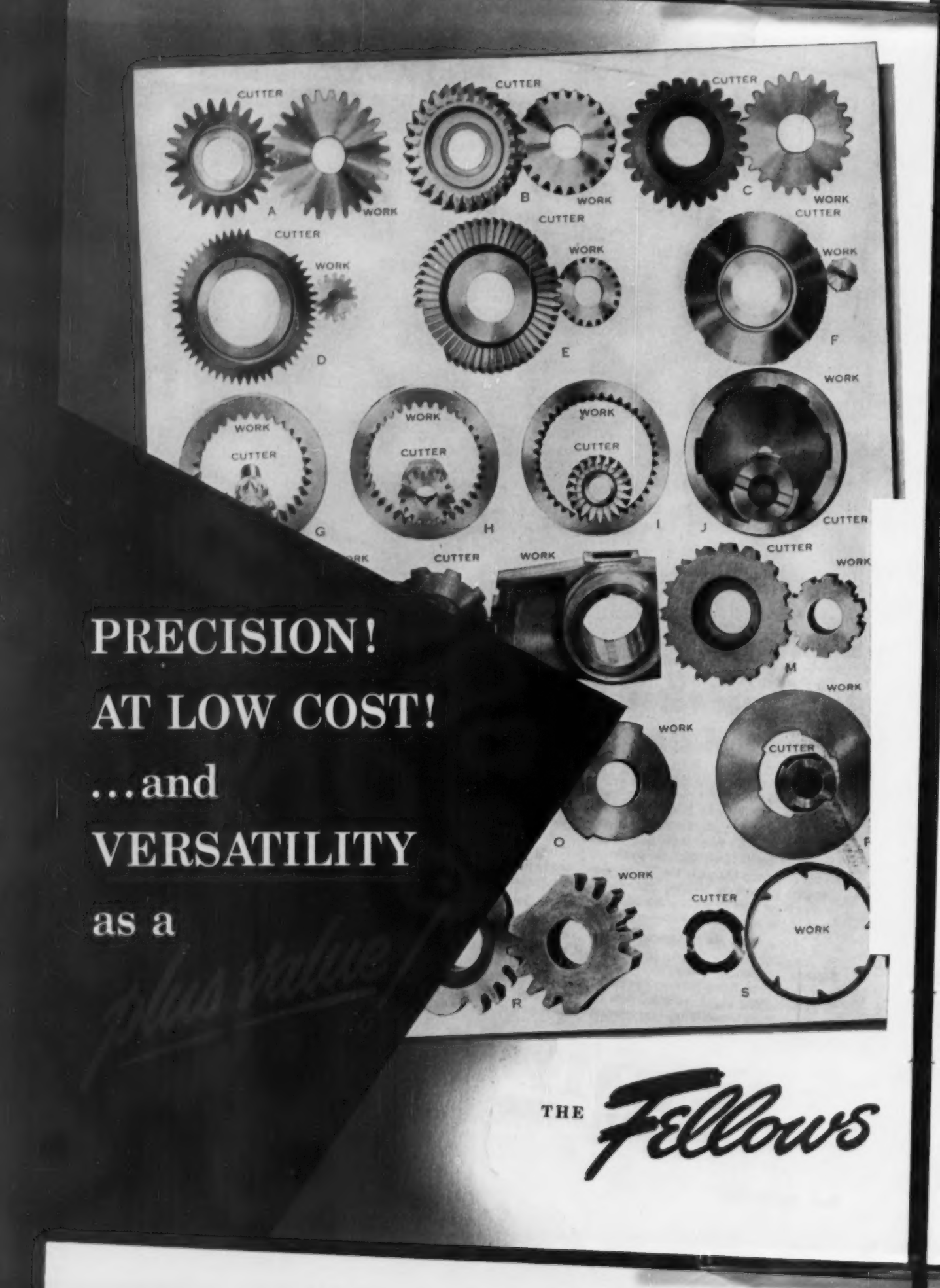

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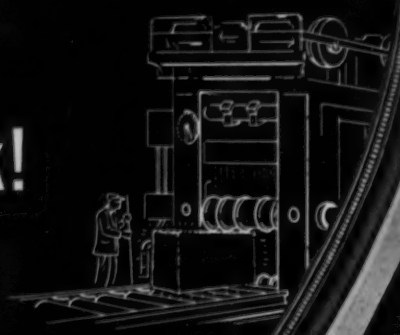

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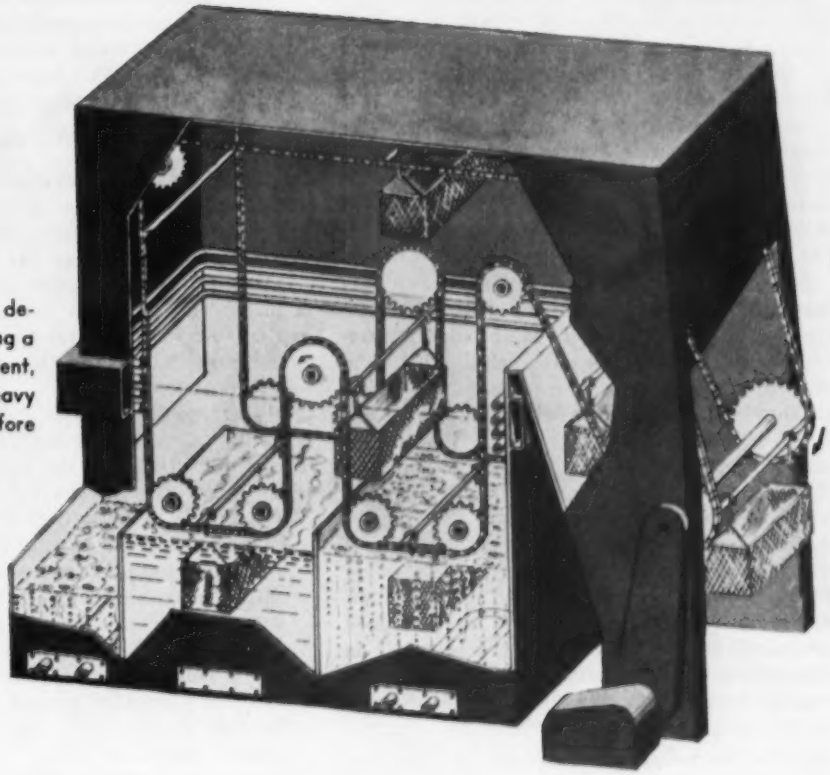
In treating aluminum—



TWO-STAGE vapor degreasing machine, using a non-chlorinated solvent, effectively removes heavy oils and greases before anodizing.

Anodized Coatings: What They Are—How They Behave

Part I

◆ Formation of an anodized film on aluminum depends on certain conditions . . . Interpretation of these conditions is complicated by production of hydrogen in the pores . . . Impurities and alloying elements in the metal affect the oxidation potentials—at times increasing them, other times decreasing them.

◆ Film appearance is also affected by metal composition, methods, electrolytes, pre- and post-treatments . . . A film may consist of a single uniform layer or two layers having different structures and hardnesses, depending on the electrolytic attack.

By C. C. COHN,
Director of Research,
Technical Processes Div.,
Colonial Alloys Co.,
Philadelphia

◆ ELECTROCHEMICAL TREATMENT of metals produces a number of desired results. Depending on the metal and electrolyte, it can clean, descale, etch, brighten or anodize. Of the metals which can be anodized this way, aluminum and its alloys benefit most. The coatings formed when aluminum is treated anodically have great commercial value.

When metal is anodic in an aqueous, electrically-conductive solution and voltage is applied, oxygen is given off at the anode and hydrogen at the cathode (electrolysis). The voltage required to separate the oxygen depends on the conductivity of the solution, ingredients, temperature, and other factors. When oxygen is released, it tends to combine easily with certain metals. Aluminum, having a strong affinity for oxygen, unites with it to form aluminum oxide (Al_2O_3).

It is this film which improves aluminum surfaces as to corrosion protection, insulation value, rectifier effect, colorability, paint-base, abrasion resistance, electroplating base, printing base and other properties. Aluminum oxide can be formed on aluminum in solutions without applying external voltage, but the properties of these chemical conversion coats are different from those obtained electrochemically.

Commercial anodizing in the United States started in the 1930's, but the mechanism was known as early as 1857. Electrolytic cells, using dilute sulphuric acid, produced anodic films which had a rectifying effect. It was not until the last 20 years that three processes, based on dilute chromic, sulphuric or oxalic acids, achieved commercial importance.

Part II of this two-part series, covering anodizing time, current density, permeability of films, and other factors affecting the behavior of anodized coatings, will appear in the June 2 issue.

Since the original patents (chromic acid in 1924 and sulphuric acid in 1932), there have been many modifications of both anodizing systems. However, only a few have had commercial importance. One of these is the dual-anodizing process, developed by Colonial Alloys Co., Philadelphia, in which the basic chromic acid process is used as the second anodizing step.

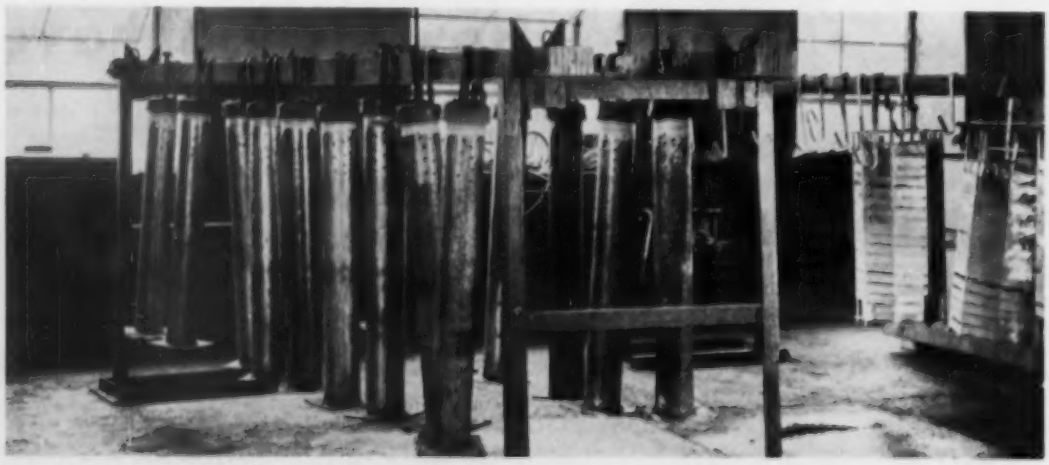
The dual-anodizing process can produce clear or colored, undichromated, anodized coatings of exceptional corrosion resistance. Moreover, instead of a 30- to 40-minute cycle, it requires only a 4- to 7-minute cycle.

Film grows inwardly

The formation of an anodized film is dependent on certain conditions. It requires reactivity of the aluminum surface, the ability for fine capillaries to form in the film through which growth can be continued, and low film solubility in the electrolyte. A film grows from the outside toward the metal because of reactions in the pores. The pore sizes will vary depending on the electrolyte used.

Interpretation of anodic oxidation, using alternating current, is complicated by the production of hydrogen in the pores. This widens the pores and stirs the electrolyte nearest the metal. The effects of impurities and alloying elements on the oxidation potentials vary. Magnesium added to aluminum decreases the potentials while silicon increases them. Homogeneous alloys require smaller voltages than heterogeneous alloys.

All electrolytically formed layers have pores which must be closed before the film can give effective protection against corrosion. This can be done mechanically with fats, waxes or lacquers; chemically as an after-treatment with dichromate, hydrolysable salts, silicates or hot water; or electrolytically with phosphates or chromic acid.



BATCH ANODIZING of small parts is done by loading them into perforated cylinders on bus bars, then moving the entire station through the cycle.

The appearance of the layers depends on the metal composition, methods, electrolytes and pre- and post-treatments. Completely colorless films can be obtained on aluminum of 99.99 pct purity. The reflective power of chemically or electrolytically polished aluminum is hardly influenced by such films. Oxide films may become colored if certain electrolytes are codeposited and decomposed. For example, a yellow-bronze color can be obtained with oxalic acid on aluminum.

In an anodizing electrolyte of 10 pct sulphuric acid, using 99.95 pct aluminum and anodizing at 18° to 20°C at a constant current density of 0.01 amp per sq cm and at 14 to 18 v dc, micromeasurement of the oxide layer shows an increase in thickness proportional to the time of electrolysis, and then a definite decrease. Analysis of the oxides by layers shows that the concentration of SO_4 ions decreases exponentially from the surface to the deeper layers.

The observed decrease of the oxide layer thickness on prolonged electrolysis can be explained by a saturation with SO_4 ions at the electrolyte oxide layer interface which leads to the formation of soluble salts. The SO_3 content of the whole oxide layer ranges from 8 to 13.5 pct. On electrolysis of aluminum in 0.16M oxalic acid solution with 0.01 amp per sq cm at about 120 v, there is a constant proportional increase of the oxide layer with time. The layer contains 3 to 3.3 pct of oxalate ion.

Alloys containing 0.8 to 6.65 pct Mg, 0.35 to 0.90 pct Mn, 0.25 to 0.40 pct Fe, 0.20 to 0.95 pct Si, 0.02 to 4.1 Cu, balance Al, were anodically oxidized in a 10-pct sulphuric acid solution at 20°C ±0.5°C and the thickness of films determined. The thickness is lowest for the 0.8 pct Mg-4.1 pct Cu alloy and highest for the 5.1 pct Mg alloys.

Since different aluminum alloys have different electrical conductivities, the same voltage carries varying currents in them. The value of the varying currents is responsible for the thickness of the films. Current density drops with time because the film resistance increases. The drop is more pronounced at higher voltages. Quenched specimens have better films than those in which precipitation has taken place.

Aluminum oxide films produced by anodic oxidation may form a uniform layer or may consist of two layers having greatly different structure and hardness. The phenomenom depends on the attack on the aluminum oxide by the electrolyte. With a sulphuric acid electrolyte, and under a given critical temperature, the attack is limited to the outside surface and is uniform. It may only reduce film thickness.

At higher temperatures, the action penetrates locally into the film, changing greatly its fibrous nature and compactness. Copper impedes film formation; zinc and magnesium facilitate it.

Two layers make up film

The anodized film on aluminum is duplex, consisting of a thin, almost impervious barrier layer and a thick porous outer layer. It is amorphous when freshly formed and may consist of an anhydrous oxide or contain adsorbed water. On boiling, it is converted to monohydrate bohmite and on heating in air, it loses water to yield an oxide almost identical with Y-Alumina. The film is hard and has little ductility. It is translucent or transparent and is a good electrical insulator.

The protective effect of an oxide film on a metal surface is best determined by means of a volume quotient. The volume quotient is the ratio of the molecular volumes of the oxides (molecular weight density) to the atomic volume of the metal. If this quotient is smaller than one, it signifies that the oxide film cannot cover

ANODIZING of aluminum wire requires that it first be respooled onto special racks.

the metal surface without pores and can provide no protection.

If the volume quotient is greater than two, it signifies that the oxide film occupies considerably more space than is made available by the base metal. The result is stressed oxide coatings which flake away with a slight blow.

Oxide coatings with volume quotients between one and two are generally regarded as favorable for protective action. However, other factors can play important roles. Metals with volume quotients of one to two have an oxide coating growth conforming to the fourth power of time, and there is accordingly a parabolic law. Examples by which these requirements are fulfilled are nickel and aluminum.

Pore size affects coating life

Continuation of the reaction must be controlled by diffusion reactions so that the metal surface can be practically carried without pores by the oxide. The oxygen is relatively voluminous. As a result, the metal ions almost always undertake the material exchange. The metal ions migrate via faulty places in the oxide lattice and react with the oxygen at the external surface of the oxide coating. Because of electron neutrality, the equivalent number of electrons must accompany the wandering metal ions.

Aluminum oxide coatings have good protective action presumably, because of their volume quotient of 1.6. The total oxidation rate is determined by the rapidity of diffusion of aluminum ions. This applies only to low-temperature modification of aluminum oxide, alpha to aluminum oxide, and not to high-temperature modification.

The size and number of the pores have outstanding technical significance in regard to application and service behavior of anodized coatings. Their examination by the use of an electron microscope is difficult. Therefore, investigations were conducted by existing pore test methods.

Modifications and their applicability of these test methods were also examined. In applying these methods, a fundamental differentiation has to be made between the coarser micropores visible to the naked eye or at magnification of 30X and the micropores with average diameter of 0.04 microns.

The following methods were studied: (1) attack by chemical reagents, such as sublimate solution, copper sulphate solution and others on the base metal through the anodized coating; (2) the increase in weight by impregnation of anodized coatings with lead nitrate, copper sulphate and potassium dichromate; (3) the effect of reflected and transmitted light on anodized coats at 1000X and (4) the relation between the anodizing duration, the increase in coating thickness, and light reflection of the coatings.

Attack of the base metal through the coating by chemical reagents takes place only through relatively few micropores. These are located mainly at the edges and at points of surface unevenness. The micropores at the edges appear to be of greater diameter. No attack was found after three days exposure when the micropores were sealed.

The effect of dyeing or impregnation methods extends over all the pores, but intermediate drying must be avoided. By this, the structure of the coating is changed imperceptably.

Examination by transmitted light of coatings removed from the base metal showed regions with varying light transmission. On dyeing and subsequent microscopic examination, greater dye absorption was seen in these areas. Obviously, greater pore formation occurs in certain areas. The light reflective capacity falls with increasing growth thickness. Also, the thickness growth leads to an optimum thickness value and then again falls by virtue of the lack-dissolving effect of the electrolyte.

Electrolytes for producing varying types of films can be classed into six groups as to their effect on protective films under anodic polarization. Nitrates do not dissolve the film. Borates, bicarbonates and phosphates dissolve it very slightly. Oxalic acid, sulphuric acid, alums and permanganates dissolve the film slowly and caustic alkali rapidly. Hydrochloric acid and chlorides cause perforations.

In anodizing in sulphuric acid, the limiting film thickness is due to the increase in oxygen evolution. Current variation with time, and at constant potential, indicates that film resistance decreases slightly, rather than increase, with increased thickness. Aluminum anodized for different periods of time shows higher potentials for samples with thicker films. The transient ohmic resistance of the film increases with increased potential.

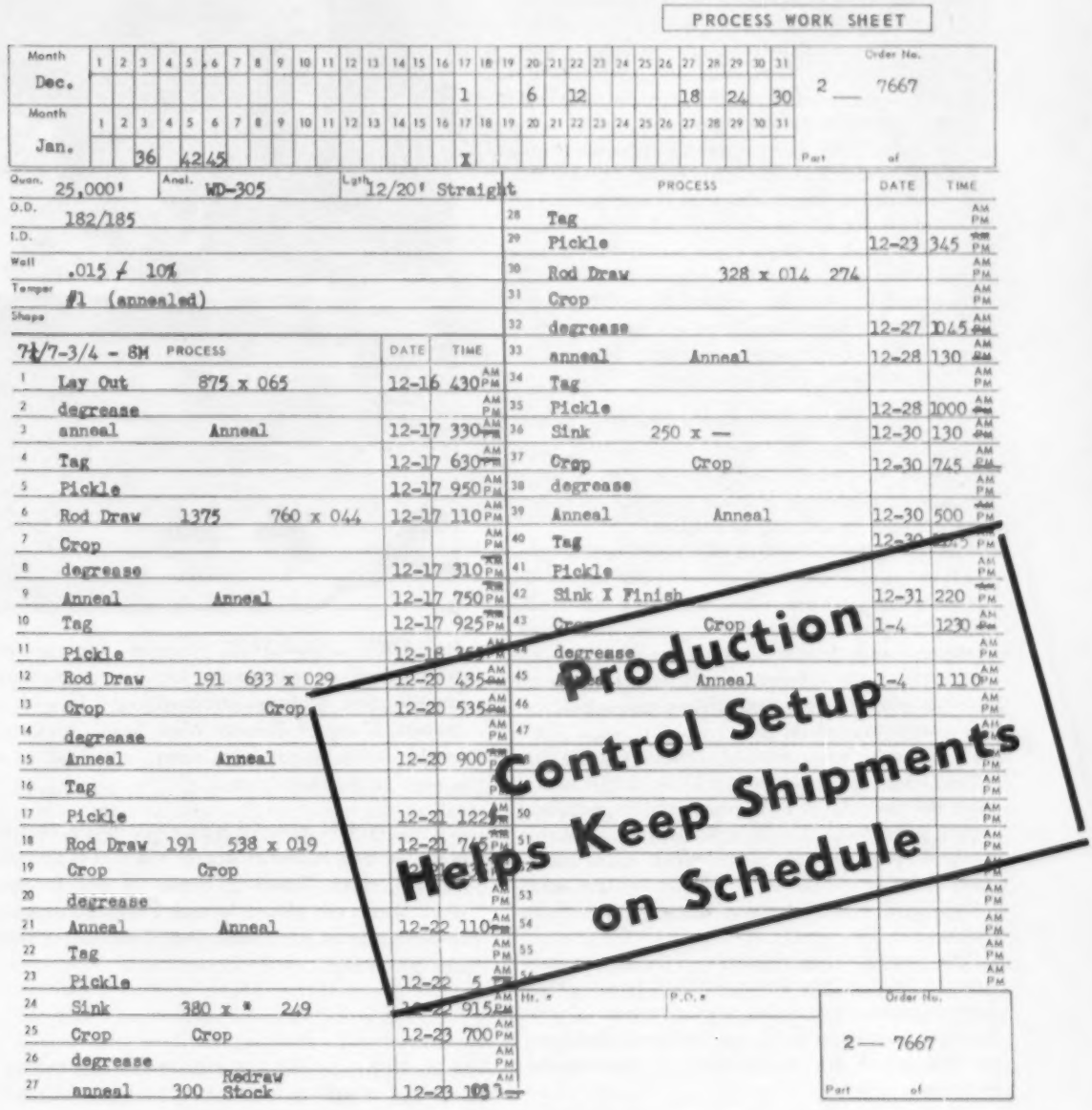
Coating influences reflectivity

The thermal conditions of aluminum are not influenced by thin electrically-deposited oxide coatings. On the other hand, emmissivity increases sharply with increased thickness of the oxide layer. The effect of pigments is to be disregarded. The reflective power of the oxide layer of the infrared decreases with increasing thermal emissivity. The oxide layer reduces the reflective power of aluminum for ultraviolet.

In sulphuric and oxalic acids, the growth process occurs within a thin compact barrier of aluminum oxide adjacent to the metal. Electrolytic conduction in the oxide film causes aluminum ions to dissolve from the metal surface into the oxide, thus leaving spaces into which oxygen ions can be forced by the electrical field. This proposed theory explains the observed film properties including adherence, porosity, experimental efficiency ratios and luminescence.

Anodized coatings on aluminum are, for the most part, aluminum oxide. The more pure the aluminum, the more transparent, continuous and protective will be the coating.

For made-to-order items—



PROCESS WORK SHEET

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Dec.																	1			6		12					18		24		30
Jan.			36		42	45											X														

Order No. 2 — 7667 Part of

Quan. 25,000' Anal. WD-305 Lgth 12/20' Straight

O.D. 182/185

I.D.

Wall .015 ± 10%

Temper #1 (annealed)

Shape

7½/7-3/4 - 8M

	PROCESS		DATE	TIME
1	Lay Out	875 x 065	12-16	430 PM
2	degrease			
3	anneal	Anneal	12-17	330
4	Tag		12-17	630
5	Pickle		12-17	950 PM
6	Rod Draw	1375 760 x 044	12-17	110 PM
7	Crop			
8	degrease		12-17	310 PM
9	Anneal	Anneal	12-17	750 PM
10	Tag		12-17	925 PM
11	Pickle		12-18	
12	Rod Draw	191 633 x 029	12-20	435
13	Crop	Crop	12-20	535
14	degrease			
15	Anneal	Anneal	12-20	900 PM
16	Tag			
17	Pickle		12-21	122
18	Rod Draw	191 538 x 019	12-21	745 PM
19	Crop	Crop		
20	degrease			
21	Anneal	Anneal	12-22	110
22	Tag			
23	Pickle		12-22	5
24	Sink	380 x * 249		915 PM
25	Crop	Crop	12-23	700 PM
26	degrease			
27	anneal	300 Redraw Stock	12-23	105
28	Tag			
29	Pickle		12-23	345 PM
30	Rod Draw	328 x 014 274		
31	Crop			
32	degrease		12-27	1045
33	anneal	Anneal	12-28	130
34	Tag			
35	Pickle		12-28	1000
36	Sink	250 x —	12-30	130
37	Crop	Crop	12-30	745
38	degrease			
39	Anneal	Anneal	12-30	500 PM
40	Tag		12-30	
41	Pickle			
42	Sink X Finish		12-31	220 PM
43	Crop	Crop	1-4	1230
44	degrease			
45	Anneal	Anneal	1-4	1110 PM
46				
47				
50				
51				
53				
54				
55				
56				

Ht. * P.O. *

Order No. 2 — 7667 Part of

Production Control Setup Helps Keep Shipments on Schedule

OPERATION

A.	Anneal	Gd.	Grind	P.	Pickle	R.P.	Rotary Polish	Str.	Straighten
Bl.O.	Blow Out	L.O.	Lay Out	P.D.	Plug Draw	S.B.	Sand Blast	Sy.	Syphon
Cr.	Crop	Lu.	Lubricate	P.De.	Pump Degrease	Se.	Seal	T.	Tag
De.	Degrease	Nor.	Normalize	R.	Redraw Stock	Sh.	Shape	T.R.	Tube Reduce
De.S.	Degrease I.D. Spray	N.A.	Normalize Anneal	R.D.	Rod Draw	Sn.	Sink	Wd.	Weld

PROCESS WORK SHEET is heart of control system, lists operations in sequence and target dates (top) for their completion. One copy travels with the job, another stays in the mill office control center where progress of the order is noted according to sub-station phone reports.

◆ Booming business in large plants producing tailor-made items can often mean delivery delays . . . To cure such headaches, Superior Tube Co. installed a simple production control system . . . Features are a detailed Process Work Sheet with successive target dates, plus an inter-plant phone system . . . In less than a year delivery efficiency rose from 50 to 87 pct.

By C. W. BULER, Plant Superintendent, Superior Tube Co., Norristown, Pa.

◆ MEETING PROMISED DELIVERY dates implies a good production control system. Even so, it is not always an easy job to get shipments out on time. And the problem can be especially difficult when a plant does not produce stock items, but instead turns out a wide variety of parts on a made-to-order basis.

In June, 1954, due to greatly increased business, Superior Tube Co.'s specialty redraw mill at Norristown, Pa., found that it was behind on almost 50 pct of its delivery schedules. Management took prompt steps to install a new production control system, which, by early this year, had boosted this record to an 87 pct on-time level. There has been no corner-cutting on quality or inspection, nor any installation of new manufacturing equipment.

Can apply to many plants

Nature of the new production control technique is such that it could be adopted by other plants that process a large number of tailor-made items in varying quantities.

At the Superior plant the new control procedure guides an average of 1100 orders in process at any one time, involving up to 55 analyses for tubing in many sizes, quantities, tempers and finishes. Since each order requires 20 to 30 different operations, the system must watch an estimated million and a half details simultaneously.

Superior's new method completely fulfills three basic requirements: (1) It tells exactly how the material is to be processed by detailing every operation; (2) it specifies on a master control form the exact date when each operation is to be completed; (3) it tells the exact location of material in process at any given time.

The two principal features of the new system are (1) the use of a Process Work Sheet which both controls production and serves as a production record, and (2) an internal telephone hookup which is independent of the regular telephone system.

Space is provided on the Process Work Sheet for production department personnel to list every step in the manufacturing cycle—giving assurance that the prescribed methods are followed in the mill. This overcomes vagueness of instructions, eliminates consultations and delays for deciding intermediate steps and gives a detailed procedure for repeat orders of the same item.

At the top of the Process Work Sheet are duplicate columns of date spaces numbered from 1 to 31. These spaces are for filling in the number of the process step to be completed on that date. Both sets of numbered spaces are used whenever processing of an order covers part of two successive months.

In practice only the dates for completing the major drawing steps and the final mill operation are filled in on these calendar spaces. Dates and times of material arrival for intermediate steps are filled in on "date" and "time" spaces provided on the same lines which list each processing step.

As each job is received in a processing department, specific information as to order number, size and type of material is reported over the internal telephone to the central control station in the mill office. This information is promptly recorded on a copy of the Process Work Sheet which is maintained in the mill office so that the status of any order can be checked at a moment's notice.

In addition to the central control station in the mill office, the communications system has telephone stations in eight mill departments and in the production office. The central con-

Top: STIFF CARDBOARD "traveler" tag contains most essential order data for instant material identification, is always attached (right) to work in process. Copy of Process Work Sheet is always nearby, either clipped to crane control or in a pocket on the tubing rack.

Bottom: WHEN material is received in any control area, the man in charge phones the arrival time to the mill office. Traveling copies of the Process Work Sheets are placed in desk bins according to operations to be performed. Sheets for most urgent jobs go on top.

WIDE FILE in mill office holds copies of Process Work Sheets for entering information according to telephone reports from departmental control stations. Orders are filed numerically.

trol station is manned on a 24-hour basis. Each station in the mill is attended by a man who acts as production planner and dispatcher in that department.

"Daily Rush Lists" maintained for the old production control system are also an integral part of the new setup. They are made up from the mill office copies of the Process Work Sheets, and give such a quick visual record of the status of each job that procedure boards are no longer used.

For quick reference, the mill office files its copies of the Process Work Sheets by order number. Orders behind schedule are kept on the right hand side of a wide file and all other orders are kept on the left. This tells instantly which orders are behind schedule, and at the same time keeps all orders in numerical sequence.

A heavy duty "traveler" card is physically tied to the material on each job. This tag correctly identifies the material in process and gives essential order facts. A copy of the Process Work Sheet also travels with the job, to spell out to leadmen and foremen the exact procedures to follow. It is not physically attached to the material but is either placed in the pocket of the tube rack or attached to the crane which transports the material.

When the material reaches a production department the Process Work Sheet is removed from the rack or crane and kept at the control station desk until all processing in that department is completed.

The man at each mill control station groups the Process Work Sheets according to the machines on which the orders will be run. He then arranges each group according to the date the operation is to be performed, with rush orders on top. In this way he can see at any time how many orders are to be processed on a given machine.

The planner-dispatcher not only knows which items are to be given preference but is also forewarned of an overload in the department or on any specific machine. Moreover, the department leadman can tell from the work sheets what items he is scheduled to process and can prepare for necessary tooling changes.

The mill foremen and the leadmen are responsible for meeting the time schedules on each Process Work Sheet. Consequently, they push those jobs with the highest priority. Since the time and date of material arrival in any department is always noted on both copies of the Process Work Sheet, a check can be made quickly on the length of time a department holds an order. This is an added incentive to get the material processed on time.

The order proceeds from sub-station to sub-station in this manner until it is finally completed and ready for inspection and shipment.

The new system not only solved the delivery problem successfully; it also brought some extra benefits. For one thing, the company finds many cases where delivery time can actually be shortened.

Also, when a distributor calls about the status of an order, the sales department can give him exact information then and there.

For volume production—

New Gear Shaper Cuts All External Teeth Simultaneously

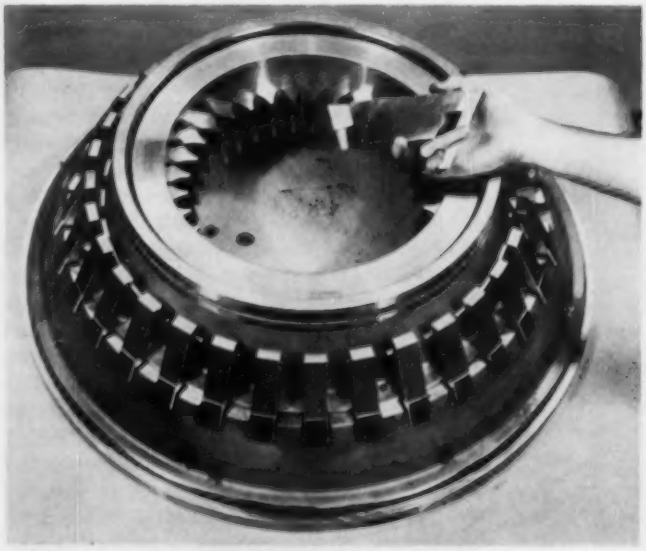
◆ Gears up to 20 in. in diam can now be cut at volume production rates . . . Michigan Tool Co.'s new Shear-Speed shaper removes up to 15 lb of steel chips in 6½ minutes.

◆ Equipment is versatile, highly accurate and designed for tooling changes in 25-45 minutes . . . Final shaving may be eliminated for many large gear applications.

◆ A HIGH PRODUCTION gear cutting machine recently introduced by Michigan Tool Co., Detroit, cuts large gears up to 20 in. diam. and 6 in. face width in 13 min. Previously, the same operation required 3 hours. Production of a set of 6 gears on this new machine is expected to exceed the combined output of 18 pieces of equipment previously used for the same set.

In addition to remarkable cutting speed these advantages are claimed for the new equipment: (1) unusual versatility, (2) ability to hold a true radius at the fillet, (3) maximum production per square foot of floor space and per man hour, (4) reduced manual effort required to change tools or load and unload large gears, (5) quick inter-changeability of cutting tools to accommodate different part sizes and shapes.

The new Shear-Speed model weighs over 44 tons and is more than 17 ft high. Since this machine cuts all teeth of an external contour simultaneously, the equipment is readily adaptable to volume production of gears, splines, ratchets, clutches, cams and similar parts. Expected ap-



FORM-RELIEVED cutting tools are ground to close tolerances, fit into radially-slotted ring.

plications of the new equipment include agricultural and road building machinery components, marine, aircraft, tractor and truck gears and splines, automobile flywheels and clutch parts. The comparatively long stroke of the machine permits stacking of parts, if desired.

In cutting a 12½ in. cluster gear from a 188 lb blank, the machine removes over 15 lb of chips in 6½ min. A built-in chip conveyor removes chips as fast as they are produced. Lubrication of the machine, cooling of cutting tools and chip removal is made possible by the circulation of more than 5 bbl of oil per min.

An automatic hydraulic positioning hoist swings the head easily into position for mounting in the machine. Blanks weighing several hundred pounds are also handled by this built-in hoist.

Three automatic lubricating systems feed a continuous flow of oil to all moving parts. One network lubricates all working components of the head, including cams, shafts and bearing surfaces. Another system lubricates the two cone-drive gear sets. A third system lubricates the moving components of the reciprocating work ram—the connecting rod, wrist pin, bearings, etc. A warning bell notifies the operator if the vital ram section is not receiving proper lubrication.

Either hydraulic or pneumatic clamping fixtures can be used on the new Shear-Speed machines. Operation of the clamping cycle is tied into the completely automatic machining cycle. Cutting heads are fully interchangeable. Stroke of the reciprocating work ram of the machine is adjustable to the face width of the parts being cut, assuring optimum cutting stroke efficiency.

Complete changeover of tools, including the cutting head, locating and clamping fixtures, can be accomplished in 25 to 45 min. Tooling cost per unit produced is said to be unusually low.

Runout can be held within 0.002 in. on large gears. Surface finish can be controlled so that shaving on many large gears will not be required, according to Michigan Tool Co. engineers. The accuracy of the machine is built into the cutter, the cutter head and the cone control.

One of the first parts produced on the giant machine was a large cluster gear for earth moving equipment. The gears are 12½ and 6½ in. in diam. Face width is 3¾ in. and 5½ in., respectively. Gear pitch is 2½ and 2. Shaping one gear on this cluster, the new machine produces 15 lb of chips in 6½ min.

Critical surfaces of each cutting tool are ground to very close tolerances. Tools are form-relieved so that sharpening on an ordinary surface grinder maintains the accuracy of the tool throughout its life.

As shown, the tool head assembly consists of three parts: a retainer housing, a radially-slotted member which controls tool alignment, and a movable, double cone-shaped guiding unit which controls the feed. The slotted head in which the tools are assembled is precision-built.

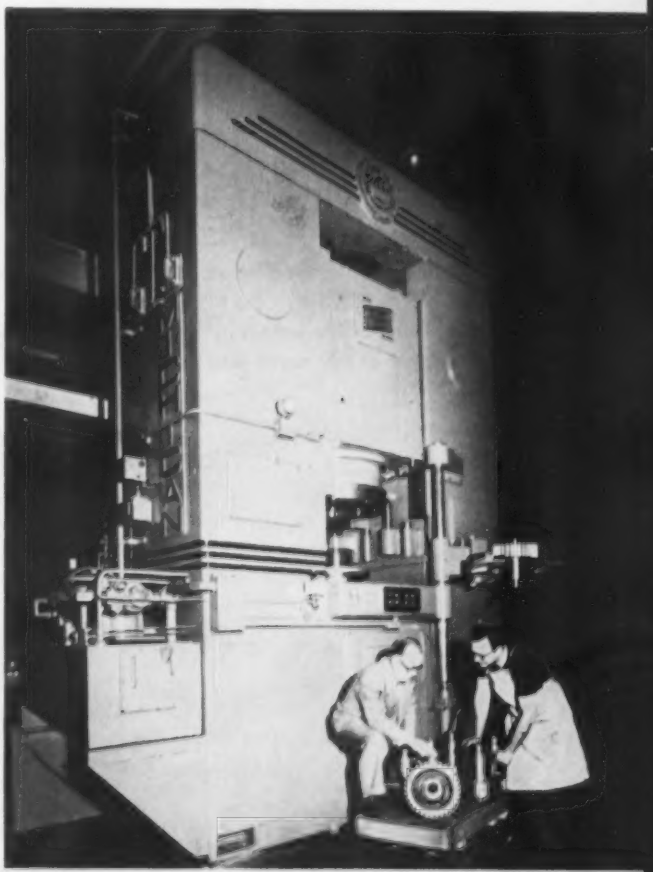
All tools are fed radially into the work at the same time by the double cone-shaped tool head. Rate of feed adjusts automatically for finishing strokes.

The cutter head assembly is mounted in the head slide, which also carries the feed and relief cams and their drives. The slide travels on scraped ways from loading to cutting positions.

When the slide lowers the head into cutting position, it is locked automatically in place by large nickel alloy wedges. Retraction of the wedges at the end of the cutting cycle is also automatic, permitting the slide to return to loading position.

The feed functions only when the head slide is locked in cutting position. Downfeed of the cones is controlled by a cam which gradually reduces the feed on each cutting stroke.

Hydraulic or pneumatic clamping may be fully automatic. Parts with shafts as well as with holes may be cut using adaptors. The work-holding adapter or fixture is securely anchored to the top of the ram which reciprocates vertically during the cutting cycle.



AUTOMATIC machine will cut precise external contours on large gears and many other parts.

Communications | PART III

Via leased 'phone lines—

Facsimile System Speeds Interplant Communications

By W. G. PATTON, Asst. Technical Editor

◆ Efficiency of interplant communications has been markedly improved at Chrysler Corp. through use of facsimile reproduction machines . . . The system, using leased telephone lines, permits fast, accurate reproduction of letters, drawings and other business papers.

◆ Built by International News Service to handle spot news fast, the Chrysler installation is the first industrial application of the system . . . Sending speed is the equivalent of 400 words plus per minute . . . No retyping is necessary.

◆ SPEED, efficiency and reliability of inter-office communications at Chrysler Corp. have taken a big step forward with installation of an electrolytic facsimile system. The system was developed by International News Service for fast transmission of news material. The Chrysler installation is the first industrial application of the system.

Facsimile will connect three of the Chrysler plants, including the Detroit John R plant, the General Office Building in Highland Park and the Wilmington, Del. tank plant. According to Chrysler officials, other facimile installations will undoubtly be made as rapidly as experience is gained with the new communications medium.

Advantages favoring the use of facsimile for inter-office communications include (1) ability to communicate virtually any kind of existing business document quickly without copying or retyping, (2) substantial savings in the cost of inter-plant messenger service, (3) elimination of coded messages, (4) excellent copy quality, (5) ability to transmit any kind of business document, including half tones and photographs, at a rate as much as 10 times as fast as other methods.

The new equipment operates on a leased, private telephone wire and can be used, if desired, only when the telephone line is not in use.

Part I of this series on industry communications, describing a cost saving method of reproducing paperwork, appeared May 12. Part II, describing a method of coordinating technical data for ready reference, appeared May 19. Part III which appears this week is the final article in this series.

CHECKING material transmitted over machines at Chrysler's Highland Park, Mich., general office. Machines can transmit business documents as much as 10 times as fast as other methods.

While distance is a factor to be considered since the sending and receiving rate is affected, the quality of the picture is excellent at any distance. According to Chrysler officials, "The system could be used to send pictures or business documents all over the world." In fact, it is pointed out, a number of television stations are today using facsimile equipment for fast, world wide news coverage.

The first facimile installation by Chrysler Corp. was in the central records room of the Detroit John R plant. A receiver unit was installed at the Chrysler General Offices in Highland Park. When a document was needed from central files, it was transmitted by facsimile from John R to Highland Park at a rate of 3½ in. per minute.

The rate of transmission is somewhat slower for distances of more than 100 miles. The receiving rate for distances of more than 100 miles is 1½ ipm. The 3½ ipm speed is economical up to 100 miles. The 1½ ipm speed is economical over 100 miles. This is due to the higher cost of a high quality long distance line. However, even at the long distance rate, Chrysler estimates it is able to send the equivalent of 432 words per minute with facsimile compared with only 40 words per minute using teletype. To put it another way, transmission time may be reduced to as little as one-tenth the previous rate. Morever, facsimile insures that papers will not be lost in transit since they are not removed from the central records department.

Reproducibility and accuracy of the facsimile picture are remarkable. As shown in the accompanying illustrations, many types of material, including letters, printed documents, line drawings and photographs can be transmitted quickly and with perfect accuracy. The need for copying or retyping any existing document is eliminated. While the present limitation is 9 in. in width, new facsimile equipment is expected to be available in the future that will increase this to at least 18 in.

PAPER reproduced on the facsimile machine is an exact copy of the original material.

Documents and photographs may be duplicated rapidly and in remarkable detail . . .

While a large part of the use of facsimile by Chrysler up to this time has been for emergencies, it is expected that a vast company network will eventually be built up, including Chrysler plants on the east and west coasts.

Cost of the new facsimile installation has been substantially lower than might be expected. Both Highland Park and the Chrysler tank plant at Wilmington, Del., are connected with the John R. plant by private, direct telephone line. This expense would apply whether facsimile is used or not. From the cost of the facsimile line between Detroit and Newark, Del., alone—less than $1300 per month—should be deducted (1) value of improved service, (2) cost of typing that has been eliminated, (3) improved scope or range of the service, (4) reduced cost of messenger and mailing service.

It may also be mentioned that electrolytic facsimile may be used, if desired, to copy documents and photographs that may not be conveniently reproduced by some other method. This work is done on the monitor set that duplicates at the sender's office the picture reproduced at the other end of the transmission line.

Experience to date indicates pictures including half tones are reproduced in remarkable detail with a minimum of distortion. Since power supply frequency is controlled independently of electrical utility lines, frequency stability is excellent under all operating conditions.

No codes and no warmup

If desired, facsimile can be received through a PBX board, permitting use of the leased line for regular telephone communication.

The use of codes is unnecessary and this possible source of error is avoided entirely. It may also be pointed out that facsimile will actually reproduce a message much more rapidly than the same message can be communicated by teletype code or other methods of communication. Ability to transmit a completely accurate picture in the least possible time is undoubtedly one of the outstanding advantages of facsimile, according to Chrysler officials.

Warmup time is virtually unnecessary, being a matter of 15 seconds or less.

The facsimile machine works like this: Copy to be transmitted is wrapped around a drum. As the drum revolves, a photo-electric cell scans the copy at the rate of 2400 impulses per sec. The cell transposes the varying degrees of darkness in the copy to a corresponding intensity of sound waves. The sound waves go out directly over the telephone wire from the sending set to the receiving set.

At the receiving end, the sound is converted back to electrical impulses which are carried to a bar of steel called the printer bar. The printer bar is in direct contact with a sheet of special paper which is impregnated chemically so as to intensify any electrical impulses that are received.

As the electrical impulses pass through the printer bar, tiny ions of steel are transmitted to the paper at a rate of one ion every 1/2400 second. As mentioned earlier, the paper receiving the impulses has the property of intensifying the tiny electrical impulses it receives.

Thus, the intensity of the electrical impulses determines the intensity of the picture reproduced on the sensitized paper. The greater the intensity of the electrical impulse, the blacker the mark on the paper.

In many respects, the process is remarkably like electroplating.

The damp—but not wet—paper then passes over a bar heated to approximately 250°F. The thermostatically controlled heater bar dries the reproduced copy.

No developing or chemical processing is involved. Copy emerges from the machine at a constant rate of 3½ in. per min where the sender is located 100 miles or less from the receiver.

During the past 4 months, Chrysler has used the new facsimile to communicate a wide range of documents, including letters, line drawings, releases, notes and sketches, contracts, purchasing agreements and photographs. The quality of the picture has been uniformly good. Quality of detail has been remarkable in many instances.

Looking ahead, Chrysler Corp. sees a number of potential uses for facsimile equipment that are yet to be investigated. While it is expected that faster, more foolproof and more efficient communications service will undoubtedly pay off, Chrysler officials have their eye on other potential benefits of facsimile that may eventually be realized. Here are some of these potential applications:

1. Reducing messenger service and travel expense to a minimum.

2. Speeding up communications between the Central office and Chrysler plant divisions.

3. Shortening the time required to assemble engineering and cost data required for monthly or year-end reports or government contracts.

4. Facilitating central billing or production planning.

According to Chrysler officials looking into the future, there are undoubtedly many situations that facsimile will eventually fit into that have not even been investigated.

Better transverse strength—

Rare Earths Improve Impact Properties of 4330

◆ Rare earths can increase toughness without affecting hardness . . . Resulting improvement in transverse impact properties could reduce service failures . . . Although the cost is high, future potential is promising where optimum mechanical properties are required such as in aircraft parts.

By H. SCHWARTZBART, Research Metallurgist
and J. P. SHEEHAN, Supervisor, Mechanical Metallurgy,
Armour Research Foundation,
Illinois Institute of Technology, Chicago

◆ RARE EARTH additions can improve the transverse impact properties of 4330 recent tests indicate. Even with sulphur contents less than the maximum standard SAE requirement (0.04 pct max), rare earth additions have resulted in as much as 100 pct improvement in maximum transverse impact energy over a considerable temperature range (0° to 400°F). Future potential is of considerable interest—especially in those applications where optimum mechanical properties are required in the temperature range of −300° to +400°F.

The tests were conducted at the Armour Research Foundation where, for some years, a comprehensive research program on the effect of alloying elements on the impact properties of quenched and tempered steels has been in progress. The effect of the rare earth (misch metal) addition on impact properties was incorporated in a general investigation of the role of three residual elements—sulphur, nitrogen, and hydrogen. The proprietary misch metal addition used in this investigation had the following composition: Lanthanum—30 pct min, Cerium—45 to 50 pct, Didymium plus Yttrium—20 to 24 pct and iron plus unreduced salts—1 pct max. Metal cost for this addition at current prices averages $5 per lb and about 2½ lb would be required for a ton of steel.

Three different split heats of SAE 4330 base composition were made which permitted evaluation of rare earth additions in the presence of high and low sulphur, high and low nitrogen, and high and low hydrogen. The chemical compositions of the heats, all of which were aluminum killed, are listed in the table. All data reported are for specimens which have been hardened and tempered.

"Maximum impact energy attained by the rare earth steel is approximately doubled . . ."

While determinations of impact energy at a single testing temperature may be useful for indicating trends, it cannot be regarded as a substitute for determining the impact energy-testing temperature curve when it is desired to reach somewhat general conclusions on the effect of rare earth additions to steel. In general, absolute impact values are not as important as relative values when trying to apply laboratory data to design for service, since service conditions do not duplicate the interrelations of speed, temperature, triaxiality, and stress concentration of the Charpy test.

Fig. 1 presents transverse impact energy and percentage brittle fracture as functions of testing temperature for quenched and tempered 4330 with low sulphur, with and without rare earth additions. The impact energy curves rise to some constant maximum value with increasing temperature. In this case, maximum energy attained by the steel with the rare earth addition is about twice the value attained by the steel without the rare earth addition.

The percentage brittle fracture curves indicate that the rare earth addition had no effect in this regard and, thus, did not affect transition temperature according to the criterion of transition temperature used in this work, namely, the testing temperature corresponding to 90 pct brittle fracture. For the present tests, this is considered to be a better criterion of transition temperature than one based on impact energy because of the gentle slope of the impact energy curves and the commensurately poorer definition of transition temperature obtainable therefrom.

From all the curves of impact energy and percentage brittle fracture versus testing temperature, values of maximum energy and transition temperature were determined. In all figures, these, along with hardness data, are presented as functions of tempering temperature.

In Fig. 2 which covers longitudinal impact properties, it can be seen from the top curves that neither rare earth additions nor sulphur content affects hardness. Also, there is no clear effect of rare earth addition or sulphur content on transition temperature. Observable differences are probably due to experimental scatter.

Sulphur has no clear effect

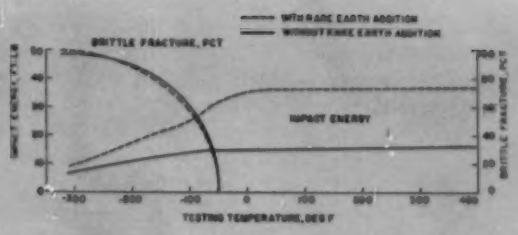
In regard to maximum energy, while there is no clear effect of rare earth addition, the effect of sulphur content is marked. For the steel containing 0.020 pct sulphur the maximum energy ranges from about 25 ft-lb at a tempering temperature of 400°F to 90 ft-lb at a tempering temperature of 1200°F. The corresponding maximum energies for the steel containing 0.038 pct sulphur are 20 ft-lb at 400°F and 60 ft-lb at 1200°F.

Fig. 3, based on data for transverse properties presents a considerably different picture. While there is no clear effect of sulphur or rare earth on transition temperature, both factors greatly influence maximum energy. The portion of the heat with the higher sulphur content has considerable lower impact energy values regardless of rare earth addition. But the addition of rare earths caused approximate-

Chemical Analysis, Pct

Heat No.	C	Mn	Si	P	S	Ni	Cr	Mo	N	H_2*
5471 (1)	0.27	0.76	0.16	0.015	0.020	1.57	1.18	0.18		
5471 (2)	0.27	0.76	0.16	0.015	0.038	1.57	1.18	0.18		
5473 (1)	0.29	0.75	0.24	0.018	0.020	1.63	1.16	0.18	0.006	
5473 (2)	0.29	0.75	0.24	0.018	0.020	1.63	1.16	0.18	0.030	
5476 (1)	0.29	0.70	0.33	0.012	0.018	1.63	1.18	0.20		2-3 PPM†
5476 (2)	0.29	0.70	0.33	0.012	0.018	1.63	1.18	0.20		6-8 PPM†

* Estimated. † Parts per million.



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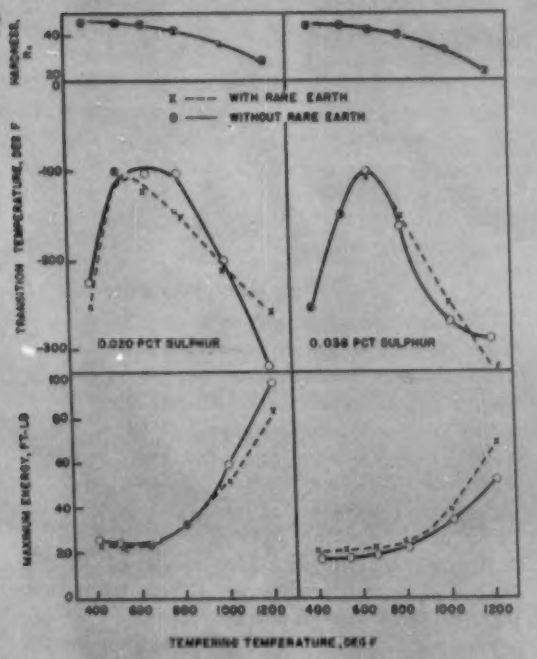

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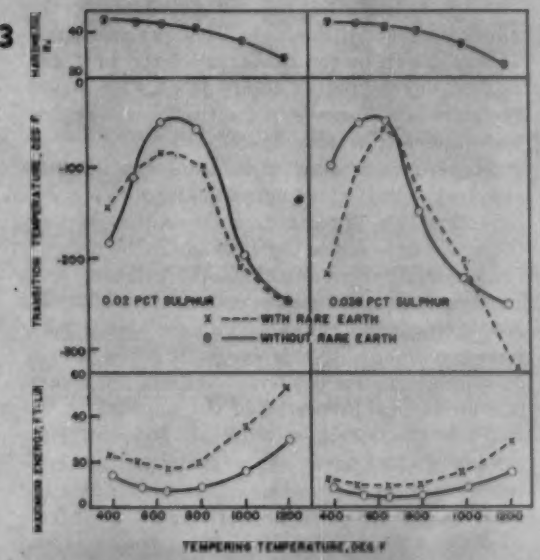

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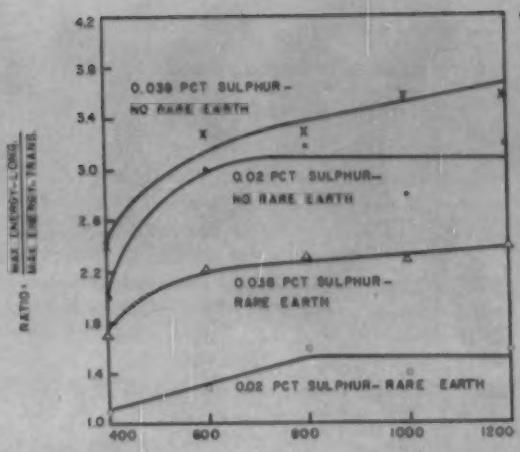

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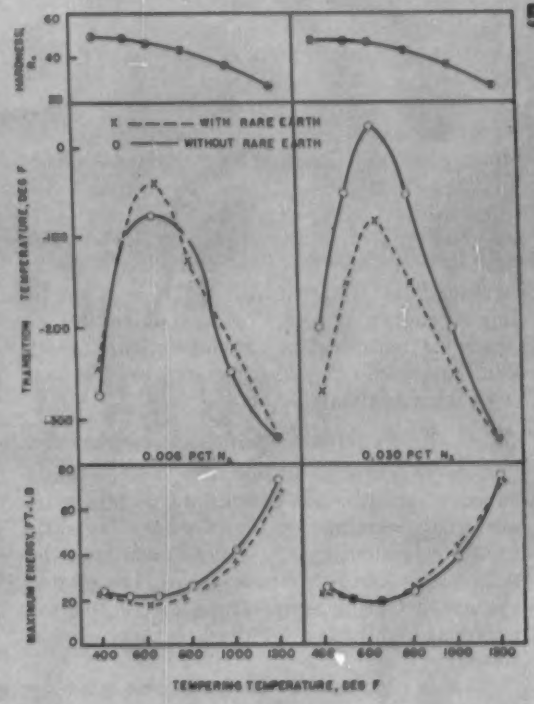

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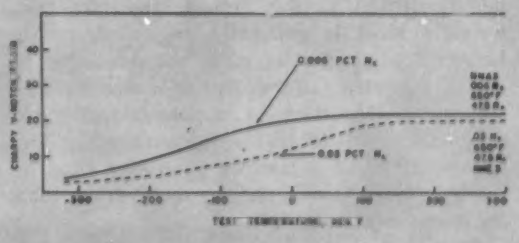

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Top to Bottom

FIG. 1—Impact energy and per cent brittle fracture vs. testing temperature for transverse specimens quenched and tempered at 1000°F.
FIG. 2—Rare earth additions as they affect longitudinal impact properties and hardness.
FIG. 3—Influence of rare earth additions on transverse impact properties and hardness.

Top to Bottom

FIG. 4—Effect of rare earth and sulphur contents on ratio of maximum energy (longitudinal) to maximum energy (transverse).
FIG. 5—Rare earth additions' effect on longitudinal impact properties and hardness of nitrogen-containing SAE 4330.
FIG. 6—Effect of nitrogen on impact properties of 4330 quenched and tempered at 650°F.

"Longitudinal properties do not point up failures due to transverse properties . . ."

ly a 100 pct increase in transverse impact values at all hardness levels, and in both the low and high sulphur parts of the heat.

What is more remarkable is the fact that the low sulphur steel containing rare earths exhibited impact values of 3:1 or more in excess of the steel with higher sulphur and no rare earths. Compare, for example, the maximum and minimum impact energy of 55 ft-lb and 15 ft-lb for the 1200°F tempered steels. This is of particular significance when it is realized that the sulphur contents of these steels are within the maximum of 0.04 pct set by AISI-SAE specification for basic openhearth steel. Similar differences in sulphur content are frequently encountered among heats of commercial grades.

Although it was mentioned earlier that there is no difference in transition temperature due to rare earth or sulphur by the standard used in comparison, large differences might be found for other criteria. Note in Fig. 1 that if a standard of 15 ft-lb were used (as in ship plate studies), rare earths cause a marked decrease in transition temperature. Or if a minimum impact energy at −40°F were required for an ordnance specification, obviously rare earth additions would increase the chances of attaining such a minimum.

Practical significance emphasized

A more graphic presentation of the large effects of sulphur and rare earths on maximum energy is contained in Fig. 4 where the ratio of the maximum energy (longitudinal) to the maximum energy (transverse) is plotted against tempering temperature. Here, too, the practical significance of these data is emphasized.

Thus in the aircraft industry especially, where the load carrying capacities of alloy steels are being utilized to the utmost, the fact that wrought steel is generally evaluated by its longitudinal properties gives no indication of possible service failures due to a weakness of transverse properties, i.e., a poor or high ratio of longitudinal to transverse strength. The design stress of a landing gear may thus be limited by its transverse strength rather than its longitudinal strength.

From Fig. 4 it can be seen that rare earth additions improve this longitudinal to transverse ratio regardless of sulphur level or tempering temperature. Notice the improvement is appreciable and, in practical terms, for some service applications in which the current load carrying ceilings are set by transverse weakness, these ceilings can be raised appreciably by additions of rare earths.

The effects of rare earths on impact properties when the nitrogen content of the steel was varied comprised a second part of the investigation. In these tests the nitrogen content was increased from the nominal 0.006 pct to about 0.030 pct by a furnace addition of $CaCN_2$. At the nitrogen levels indicated in the table ingots were poured with and without rare earths. Fig. 5 summarizes the effects observed. An increase in nitrogen from 0.006 to 0.030 pct caused a pronounced loss of notched bar toughness and an increase in transition temperature, especially in the tempering range of 500° to 800°F. This is shown by the solid curves in the left and right hand sides of Fig. 5, relating transition temperature with tempering temperature and hardness.

High nitrogen counteracted

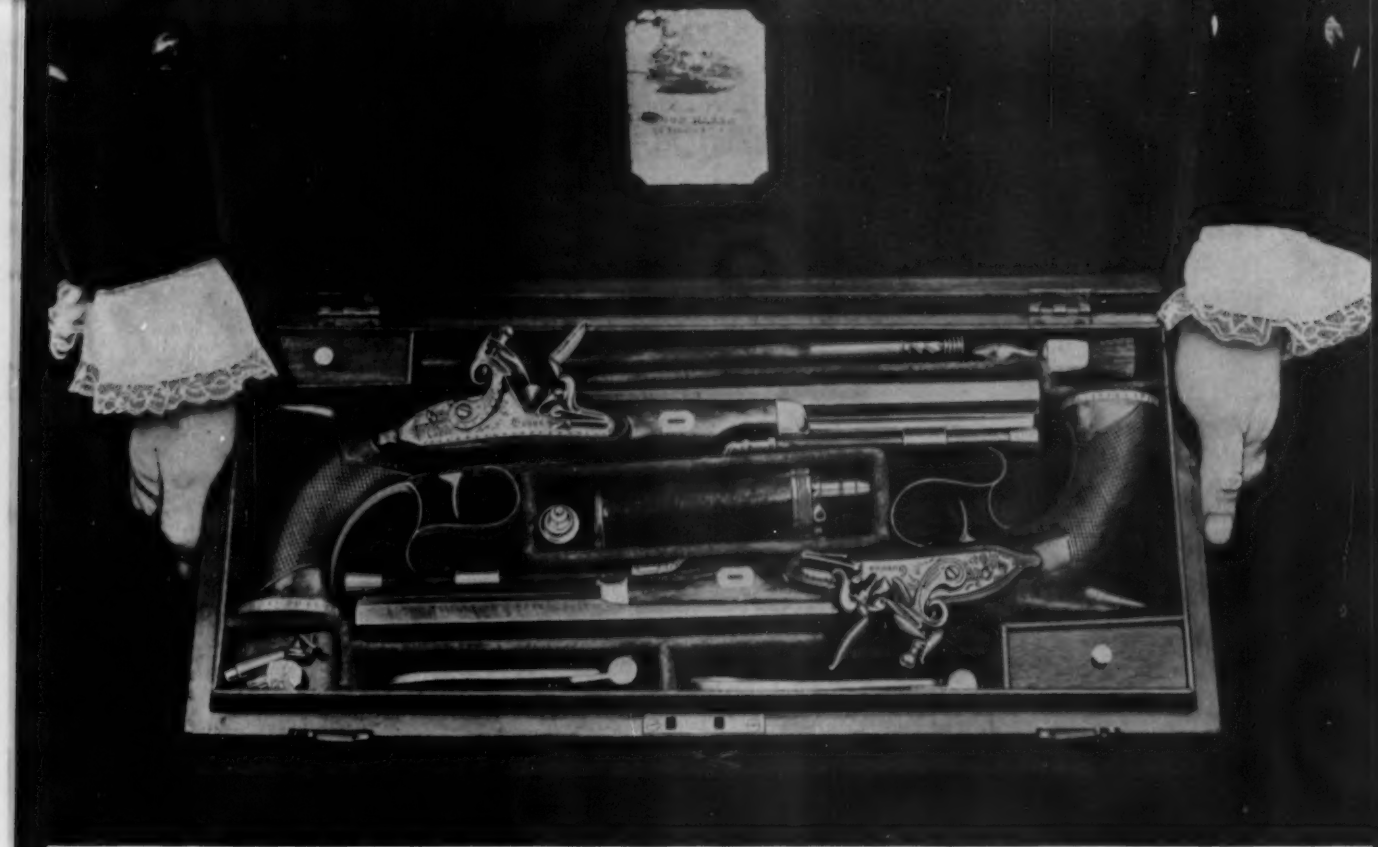
The extent of this shift in transition temperature is demonstrated more clearly by two of the individual impact energy curves for the low and high nitrogen steels tempered at 650°F (see Fig. 6). At impact energy levels of 10 or 15 ft-lb, for example, there is a 140° to 150°F difference between the two curves. With a tempering temperature of 1000° (Rc 37) there is a much smaller difference in transition temperature, and with a 1200°F temper (Rc 28) there is no difference in either transition temperature or impact energy.

The addition of rare earths to these steels had no effect where the nitrogen content was low (0.006 pct), but served to counteract the adverse effects of the high (0.030 pct) nitrogen. This is shown by the similarity of the solid and dashed curves in the left side of Fig. 5 and the marked difference in the two curves on the right side of the same figure.

These results seem to indicate that despite the large amount of aluminum used for deoxidation (2½ lb per ton) a substantial part of the nitrogen added to the steel as $CaCN_2$ did not form AlN, but went into solid solution and increased the embrittlement in the 500° to 800°F tempering range. The rare earths may have combined with this excess nitrogen, thereby eliminating its deleterious effects upon certain mechanical properties of the material.

While the nitrogen content of commercial grades of steel never approaches the 0.030 pct level, careful interpolation of the data indicates what might logically be anticipated at intermediate nitrogen levels. Also, the serious decrease in toughness resulting from high nitrogen, especially at high strength levels, is dramatically underlined.

Since the addition of the rare earths caused no apparent change in either the low or high hydrogen steels, the results are of little practical significance at this time.



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New Technical Literature:

Catalogs and Bulletins

Capacitrols

Technical literature is available regarding the application of automatic control equipment to the solution of industrial process control problems. The 16-page booklet discusses conventional millivoltmeter construction and its application to a control instrument. Also described is the function of an oscillator circuit in a pyrometer controller. *Wheelco Instruments Div., Barber-Colman Co.*

For free copy circle No. 1 on postcard p. 113.

Electrical connectors

Electrical plugs and receptacles for the power connecting requirements of industry are described. Details on Joy electrical connectors for all standard as well as many special industrial needs are given. *Joy Manufacturing Co.*

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Carbide tipped tools

An illustrated 4-page folder on the subject of brazing, grinding and inspecting carbide tipped tools is available. It is recommended not only for those new to the field, but also for experienced carbide engineers and toolmakers. Step-by-step procedures for brazing, grinding, and inspecting carbide tipped tools are given, plus specifications and diagrams. *Adamas Carbide Corp.*

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Automatic control

An automatic control systems bulletin describes in detail how ATC can assist in arriving at the right application of an automatic control system. Case histories are presented along with a description of the scope of the company's services in the phases of design, purchasing, construction, and start-up of packaged automatic control systems. *Automatic Temperature Control Co., Inc.*

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Instrumounts

"Instrumounts"—rubber insulated mountings for instruments, laboratory and other light weight precision equipment requiring isolation from vibration and noise are described in a bulletin. Many suggested uses are given, together with prices, dimensions and load bearing capacities. *Bushings, Inc.*

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Steel wire

Pertinent data to aid users of fine wires in selecting the proper stainless steel wire to meet their particular specifications is contained in a 32-page manual. The booklet discusses the three group classifications of Rezistal stainless steel (austenitic, ferritic, and martensitic), gives common uses of the wire and lists typical end products manufactured from the wire. *Crucible Steel Co. of America.*

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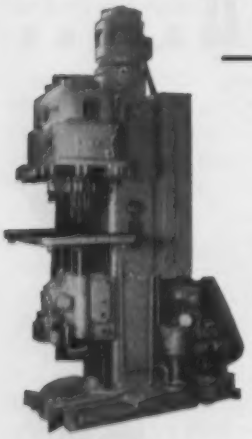

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FREE TECHNICAL LITERATURE

Dc power supplies

Vickers regulated dc power supplies convert ac power to dc power, and closely regulate the dc voltage, without the use of moving parts or electronic tubes. Each regulated dc power supply is a complete, self-contained unit, including magnetic-amplifier regulator, line contactor, protective equipment, meters, and cooling fan. Features and electrical data are also given. *Vickers Electric Div., Vickers, Inc.*

For free copy circle No. 7 on postcard, p. 113.

Chlorine analyzer

A new residual chlorine analyzer provides an automatic check on Cl_2 content in chlorinated water. This new analyzer functions electrolytically on the coulometric principle, representing a new departure in chlorine measurement. Also included in the folder are performance characteristics and method of operation. *Leeds & Northrup Co.*

For free copy circle No. 8 on postcard, p. 113.

Cost study

A production cost study of automatic electric arc welding seams of cylindrical and elliptical vessels or pipe has just been published. The bulletin contains six pages and covers the automatic welding of 10 gauge to ¾ in. plate. The study is presented in a manner which will be of interest to and answer questions of management as well as shop personnel. *Pandjiris Weldment Co.*

For free copy circle No. 9 on postcard, p. 113.

Shaft vise

A self-centering shaft vise, which can handle shafts ⅝ to 3⅛ in. diameter, is featured in a bulletin. This quick-acting vise is designed for holding shafts or spindles when machining keyways, slots or splines. It is made for either vertical or horizontal mounting. Other design features, application photos and dimensions are included. *The Producto Machine Co.*

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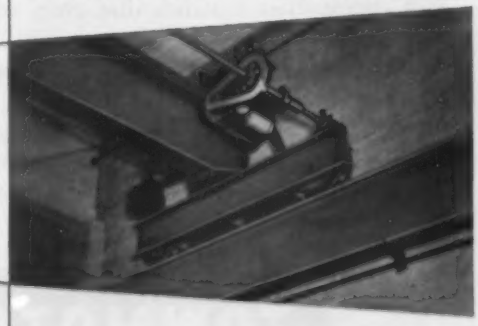

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Buyers' guide

The brand new 1955 Buyers' Guide, edited for maximum efficiency in designing and specifying screw machine products, has just been published. The report is fully illustrated and covers such topics as: what increases costs, design considerations, samples, drawings, grinding, burring, concentricity, plating and heat treating, finishing, inspection, overruns and underruns. Other subjects include conditions of sales and manufacturing practices. *National Screw Machine Products Association.*

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Mobile radiant oven

Worn-out linoleum or asphalt tile floor covering is quickly and easily removed by a unique infrared heating unit. Only seven in. wide and twenty-three in. long, the mobile oven rolls on casters, fitting into corners and against walls, ahead of the single worker needed to strip up the melted material. The unit will not harm the floor beneath the covering. *The Fostoria Pressed Steel Corp.*

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Surface finishes

Finding the right roll finish for the right job is simpified for mill engineers and machine designers in the textile, paper, plastics, rubber, metalworking, woodworking and other roll-using industries by this latest industrial roll engineering report. This report is one of a series intended to assist in the design and selection of rolls for specific plant applications. *Rodney Hunt Machine Co.*

For free copy circle No. 12 on postcard, p. 113.

Brake shoes

Automatic cleaning and surfacing of automotive brake shoes for subsequent bonding of linings is the subject of a bulletin. It gives a complete case history of one prominent brake shoe bonding company, showing how manual surfacing methods and their disadvantages were done away with by adopting the automatic airless abrasive blasting process with Wheelabrator machines. *American Wheelabrator & Equipment Corp.*

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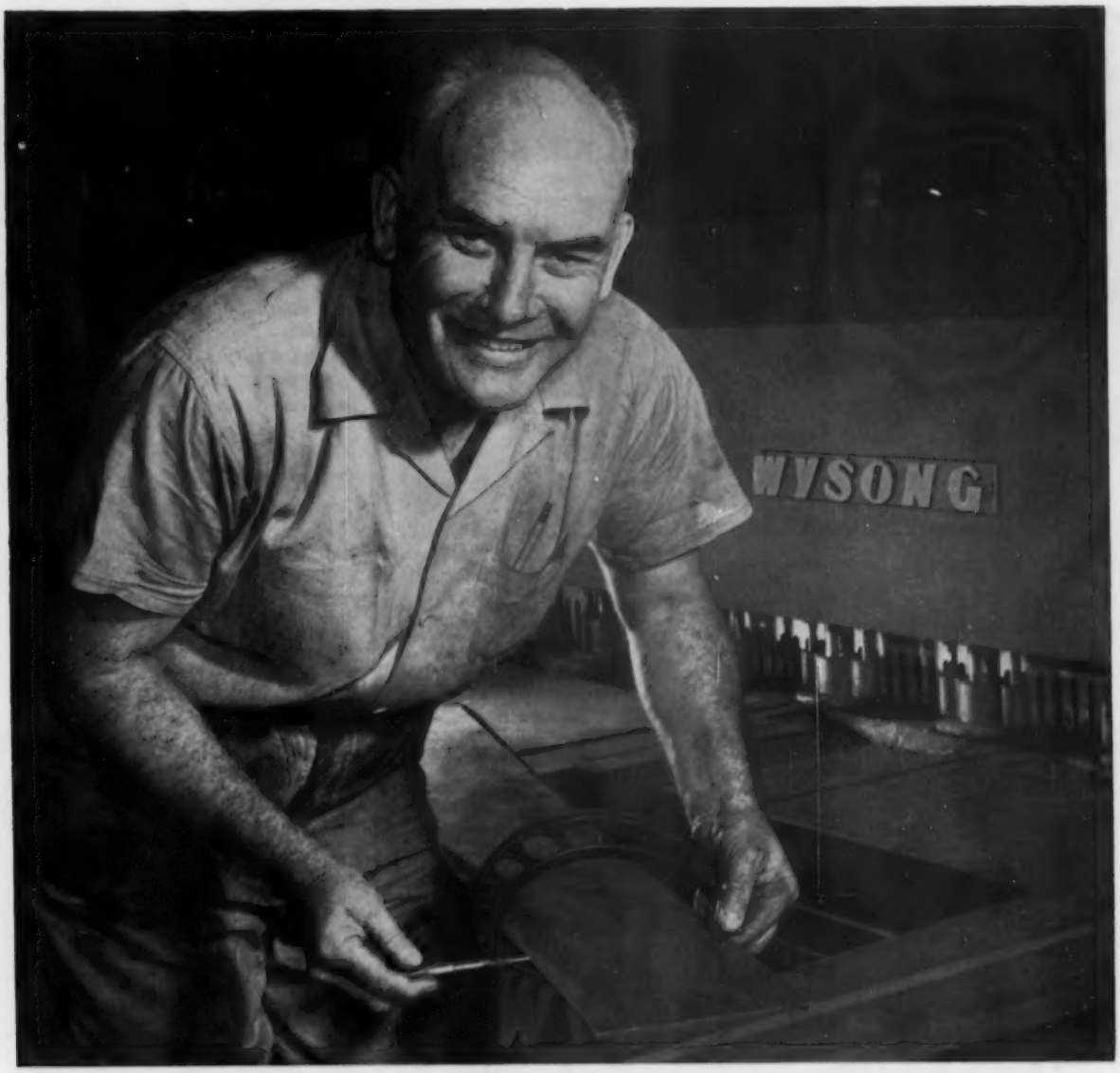

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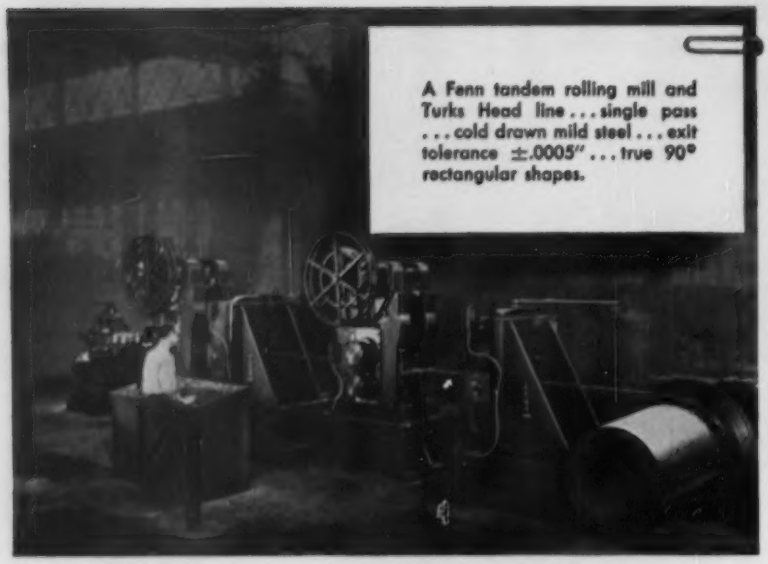

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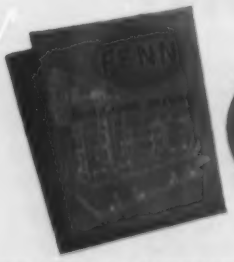

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Grinding machines

The new No. 0 centerless grinding machine, a small general purpose machine suitable for grinding a wide range of metallic or nonmetallic parts up to ½ in. in diameter, is the subject of a booklet. This machine is recommended for the rapid, accurate production of small drills, pins, punches, shafts, clock parts, instrument parts, etc. Its smaller floor space and power requirements make it a more economical producer for small diameter work. *Cincinnati Grinders, Inc.*

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Master balls

An 8-page illustrated bulletin on applications of master balls in tool room and production gaging is announced. Uses covered include setting external gages and comparators, checking flatness and parallelism of micrometer anvils, determining the location of existing holes and grooves, and measuring hole dimensions. The bulletin contains new material on checking straight and tapered holes. *Industrial Tectonics, Inc.*

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Protecting steel

An informative article on the subject of the protection of structural steel is available. It explains current good painting practice for steel structures in the United States. Topics covered include: factors in corrosion of steel; painting weathertight, enclosed building frames; painting exposed steel in dry interiors; painting weather-exposed steel; and painting steel in severe exposures. *Mellon Institute of Industrial Research.*

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Electronic device

In many cases the detection of a crack or seam only solves half the problem. Now Magnaflux announces the Sedac SE-100 seam depth indicator which can nondestructively both detect and measure the depth of cracks in iron and steel. This portable electronic instrument is already equipped with circuits for completely automatic operation. *Magnaflux Corp.*

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FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 108

Electronic computer

A high performance, moderately priced electronic computer that is capable of solving the lengthy and complex problems of research and engineering organizations is now in production. It incorporates an improved two address command structure which permits greatly increased versatility. The commands provide for addition, subtraction, multiplication and division as well as branching and other operations. *Bendix Computer Div., Bendix Aviation Corp.*

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Electric hoist

The new Lodestar, the first truly "heavy duty" version of the small electric hoist, is described. Features include push botton control, flexible link chain, and maintenance-free operation. Fully enclosed construction guards the hoist against damage. Illustrations and specifications are given in the folder. *Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp.*

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Metal melting

A handy selector guide for metal melting is offered. It explains how you can select heating equipment and control for your soft-metal melting needs. The folder is divided into three sections: how to select cast-in immersion heaters, how to select control, and how to select soft-metal melting pots. Tables and illustrations are included. *General Electric Co.*

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Vitreous enamel

Vitreous enamel on aluminum castings, the first new development in a major finish for castings in over five years, is detailed in a brochure. Results of tests conducted are given, and advantages of vitreous enamel as both a colorful finish and abrasion resistant protective coating are outlined. Technical data offers design engineers information that will provide a preliminary basis for investigating product applications. *Monarch Aluminum Manufacturing Co.*

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Electrifugal pumps

Model C-3 supporting adapter Electrifugal pumps are described in a bulletin. The units are available in capacities to 2500 gpm, heads to 400 ft and temperatures to 250° F. Pump types described include those having a casing with removable suction cover and those having a casing with suction and discharge nozzles in one piece. *Allis-Chalmers Manufacturing Co.*

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New facilities

Described in a 24-page brochure, which gives full details of plant specifications and facilities, is special production equipment designed and built by O & M. Also duplicating equipment, heavy and light machine shops, aircraft traveling cranes, metal and welding fabrication equipment, engineering, tooling and testing facilities. Illustrated and described are current production samples of aircraft parts and segments. *O & M Machine Co., Inc.*

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Gang slitters

Illustrated and described in a 24-page booklet is a line of gang slitters and accessory equipment for warehouse and factory use. The booklet covers both standard and custom-engineered slitters ranging in size from hand-operated, bench mounted slitters to fully automatic slitting lines. Discussed in detail are payoffs and coil boxes, loaders, straighteners, feed rolls, back rolls, cutters and spacers, stripper fingers, various types of scrap disposal attachments, winders and coilers. *Waterbury Farrel Foundry & Machine Co.*

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Work holding equipment

A 64-page catalog illustrates the complete line of Jergens work holding equipment and jig and fixture components. The new catalog features complete engineering data on thousands of "in-stock" sizes of chuck jaw blanks, handles, knobs, wheels, clamp assemblies and components. Part sizes are specified to the finest detail. It is a valuable aid for tool designers, engineers, purchasing agents, plant superintendents, maintenance and production supervisors. A simple ordering system has been incorporated to eliminate ordering errors. The catalog is claimed by the manufacturer to be the most complete in the industry. *Jergens Tool Specialty Co.*

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Atomic industry aids

Products which have been developed through close association with the atomic energy industry are described in a bulletin. These include radiation shielding, reactor components, transfer and storage casks, decontamination cells and remotely controlled manipulation equipment. The bulletin also describes the company's facilities for machining, welding, casting and specialized machine construction in the field of custom manufacture. *Farrel-Birmingham Co., Inc.*

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FOR MORE LITERATURE

Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Valves

A bulletin describes a revolutionary bronze globe valve which has set completely new performance standards in the most severe service in industry. Valve users, cooperating in a four-year testing program, were unable to find any service tough enough to wear out an LQ-600, or cause it to leak, even in the most severe throttling installations. *The Lunkenheimer Co.*

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Precision plating

The electroplating of metals and metal parts—to protect them, to lubricate them, to make them more attractive—has grown during the last 20 years from a haphazard operation to a highly technical process, vitally important in the manufacturing of precision products. A 32-page booklet tells the story and shows you how Standard can solve precision-plating problems of all kinds. *Standard Pressed Steel Co.*

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Dial indicators

A new line of dial indicators, combining improved design with all the dependable features of previous models, is described in a folder. 140 models are offered to meet every requirement. Precision built throughout, these new dial indicators are available in regular or non-shock types, with balanced or continuous dials, jeweled or plain (inserted bronze) bearings, English or Metric graduations, in all four standard A. G. D. groups plus a complete series of long range models. *The L. S. Starrett Co.*

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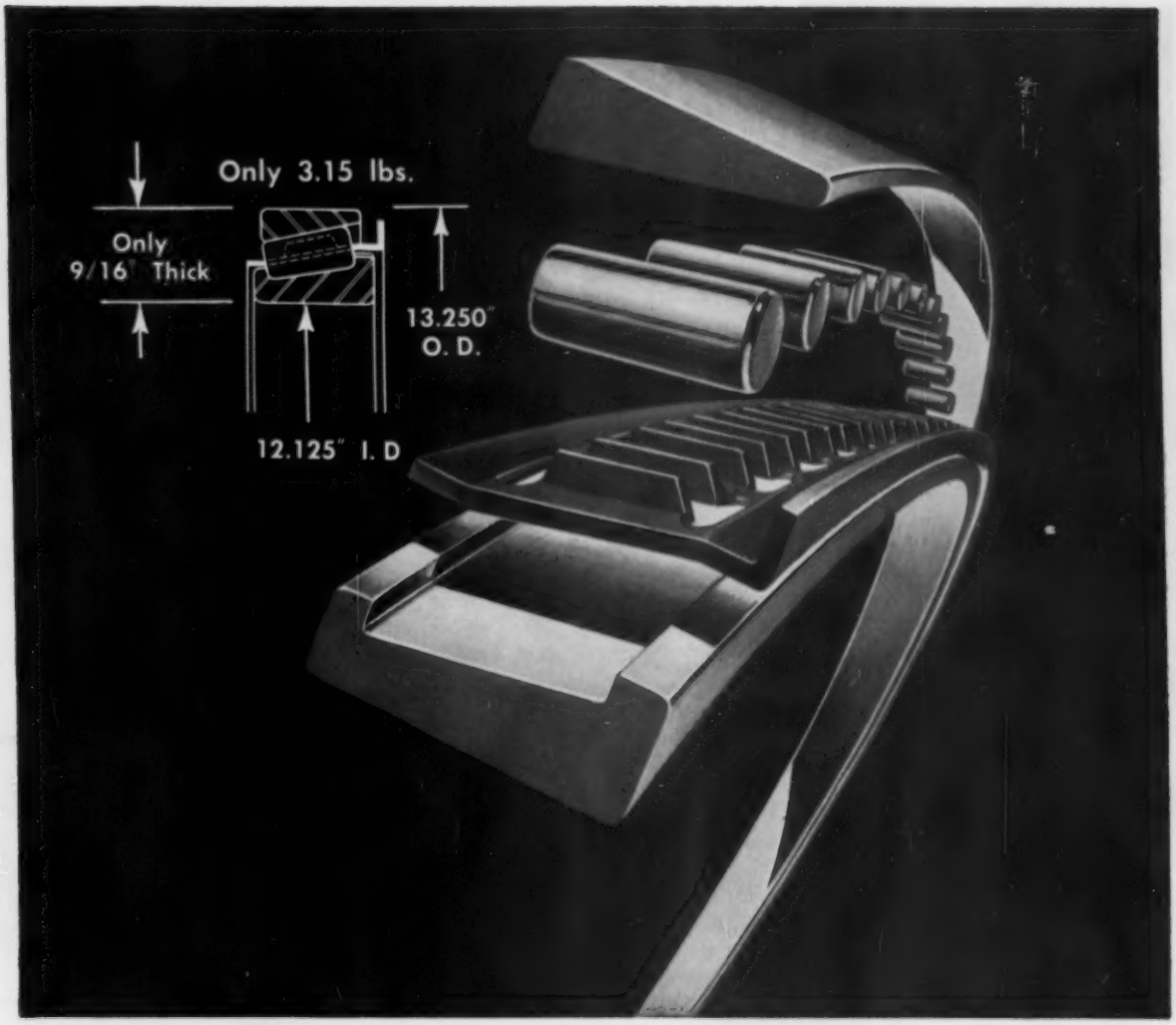

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HANDLING: Short Trip Cranes

Dual crane installation at Chicago Bridge & Iron keeps plate moving smoothly from storage to torch cutting area . . . Pendant, push-button controls simplify the operation.

A crane installation made at Chicago Bridge & Iron Co. in which the cranes move their lifts only 16 ft, has solved a tricky handling problem. Whiting Trambeam cranes are used.

The crane runway is only 60 ft long, with a span of 28 ft between the rails. On this runway are two underhung cranes as shown below.

Short Haul Problem

Each one has a 12-ton capacity bridge and 8-ton hoist. As the two cranes shuttle back and forth they provide an ideal answer to this particular short-haul problem.

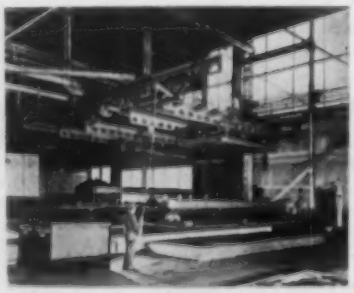
On each crane's hoist is a spreader bar 25 ft long. Three electric magnets are attached to each bar. In the handling cycle the crane farthest away from the main aisle of the plant picks up a heavy steel plate from a storage pile and moves it just 16 feet to a cutting table.

Positions Plate

When the magnets release the plate onto the table, two operators position multiple-head cutting torches, and all four edges of the plate are precision cut.

As soon as the torches are swung away from the work, the second crane picks the plate up and moves it out into the main aisle—another 16-ft trip. While one finished plate is being removed, an untrimmed plate is being brought into position for cutting.

Both underhung cranes are operated by push-button, pendant controls. The runway extends a short distance into the center aisle of the shop, so that an overhead traveling crane can pick up the trimmed plates from the very spot where the Trambeam crane deposits them, with no intermediate handling.



Handling plate . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Materials:

Improved aluminum alloy developed by Alcoa.

Research is lifting the thermal barrier that has threatened the use of aluminum in supersonic aircraft of the future, Aluminum Co. of America reports.

In lifting the veil on its new patented high temperature aluminum alloy called X2219, Alcoa stated that other pending alloy developments will combine with the current one to effectively raise existing temperature limits on aluminum.

Air Friction Heats Metal

Use of aluminum in supersonic aircraft was jeopardized by elevated temperatures of high speed flight. Friction with air at speeds

over 1000 mph generated intense heat in the skin of an airplane.

This heat, combined with that generated by the engine, threatened to raise the temperature in some parts beyond the efficient performance level of existing aluminum alloys.

Faced with this problem, Alcoa's Aluminum Research Laboratories were assigned the job of adapting aluminum to high temperature conditions. The first result reported is the new Alcoa alloy X2219, which offers excellent properties at 500° to 600°F. This temperature range is valuable for applications in and near aircraft and automotive engines.

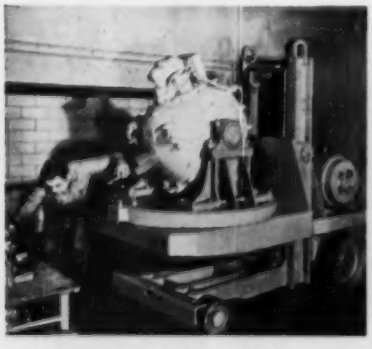
Testing:

Unit "sees" through 7 in. of steel.

A new inspection tool which makes use of radioactive Cobalt 60 and is capable of radiographing—or "seeing through"—thickness of steel up to 7 in., has been developed by The Babcock & Wilcox Co.

The unit, christened the "Isoscope," has been under study and development by B&W for the past 3 years. Only one-third the exposure time of a million volt X-ray unit is required, it is claimed. The development may pave the way for wider use of atomic energy in this industrial application.

The largest allocation of radioactive Cobalt 60 ever authorized to industry for radiographic work was assigned to Babcock & Wil-



Aiming the Isoscope . . .

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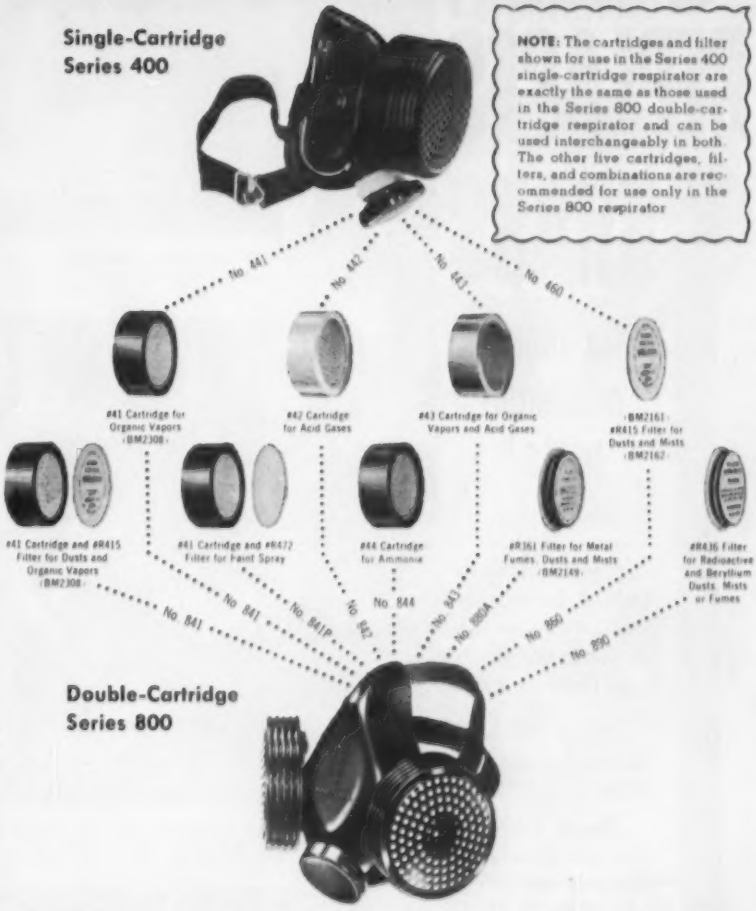
IN BOTH SINGLE AND DOUBLE CARTRIDGE STYLES!


Single-Cartridge Series 400
NOTE: The cartridges and filter shown for use in the Series 400 single-cartridge respirator are exactly the same as those used in the Series 800 double-cartridge respirator and can be used interchangeably in both. The other five cartridges, filters, and combinations are recommended for use only in the Series 800 respirator
No. 441
No. 442
No. 443
No. 460
#41 Cartridge for Organic Vapors (BM2308)
#42 Cartridge for Acid Gases
#43 Cartridge for Organic Vapors and Acid Gases
(BM2161) #R415 Filter for Dusts and Mists (BM2162)
#41 Cartridge and #R415 Filter for Dusts and Organic Vapors (BM2308)
#41 Cartridge and #R472 Filter for Paint Spray
#44 Cartridge for Ammonia
#R361 Filter for Metal Fumes, Dusts and Mists (BM2149)
#R436 Filter for Radioactive and Beryllium Dusts, Mists or Fumes
No. 841
No. 841
No. 841P
No. 842
No. 844
No. 443
No. 3002A
No. 860
No. 896
Double-Cartridge Series 800

These Willson Respirators are the first truly interchangeable types in the field. Neither style requires additional parts or accessories to make use of the cartridges, filters, or combinations indicated to be used with them.

Write for bulletins describing these new Willson Interchangeable Respirators. Standardizing on them will give you the respiratory protection you want and simplify your inventory as well.

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cox for the "Isoscope" at Oak Ridge National Laboratory on Oct. 11, 1954.

The material was loaded into a special dual-purpose spherical lead container designed and built by B&W's Barberton, Ohio, works to handle the radioactive material during shipment. The container is converted into a part of the radiographic machine upon arrival at its destination.

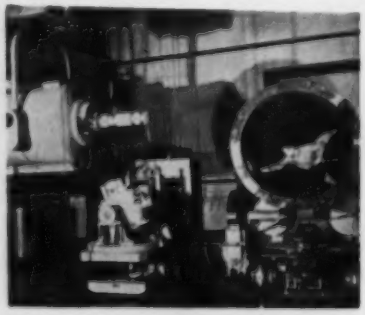
The lead sphere of the "Isoscope" is encased in a steel jacket having a cylindrical rotor section built into it. By revolving the rotor 180° the radioactive source can be brought from the "safe" position to a point in line with the coned opening in the steel jacket allowing a beam of radiation to escape. This, in effect, results in a unit which can be turned "on" and "off."

Stacked Like Coins

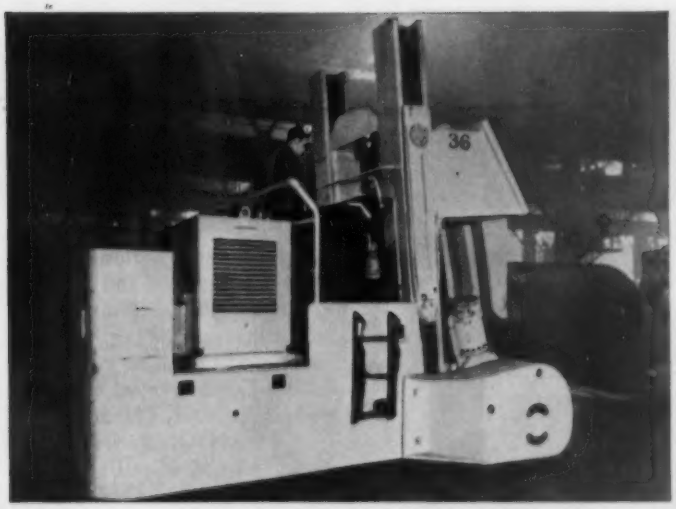
Total charge placed in the unit was 1008 curies of Cobalt 60. The charge is comprised of small disks stacked one on top of the other like coins in a coin changer. The radiation is taken from the top of this stack so that the focal spot size compares favorably with existing high voltage X-ray equipment.

The balance of the "Isoscope" consists of a modified electric platform lift truck having a "lead cab" built on the back and a "turn-table" mounted on the front platform. Trunnions on the turntable receive the lead ball containing the radioactive material.

Cover plates mounted on top and bottom of the lead balls carry the cylindrical rotating mechanism.



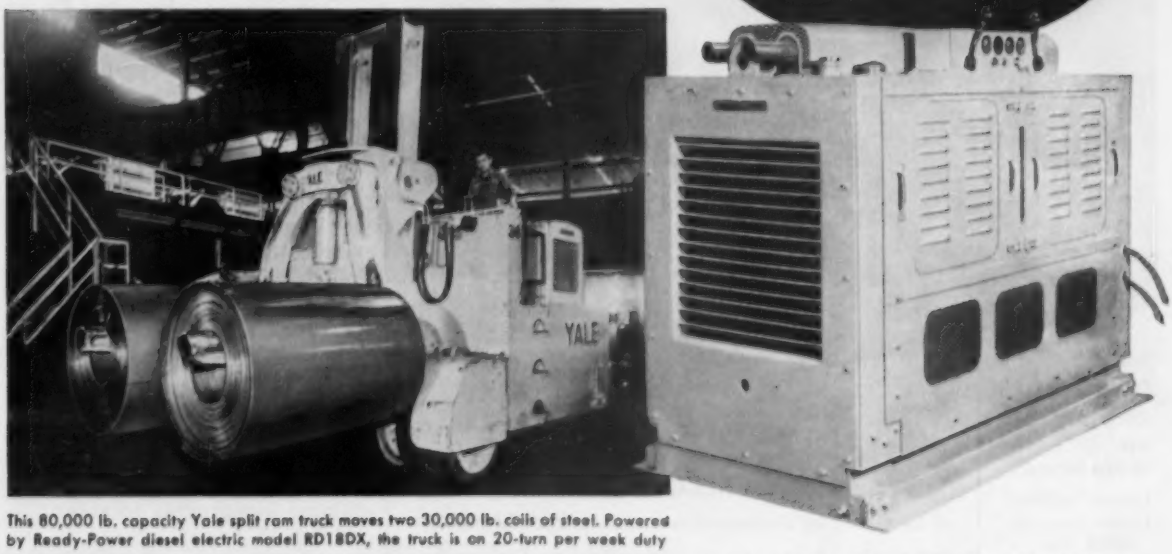
Hangs from ceiling . . .



Automatic single ram truck powered by Ready-Power diesel-electric model RD9DX handles a large coil of steel. Full electric drive makes operation extremely simple.

on the job
ALL the time
at Great Lakes
Steel Corporation

READY-POWER
DIESEL ELECTRIC
POWER

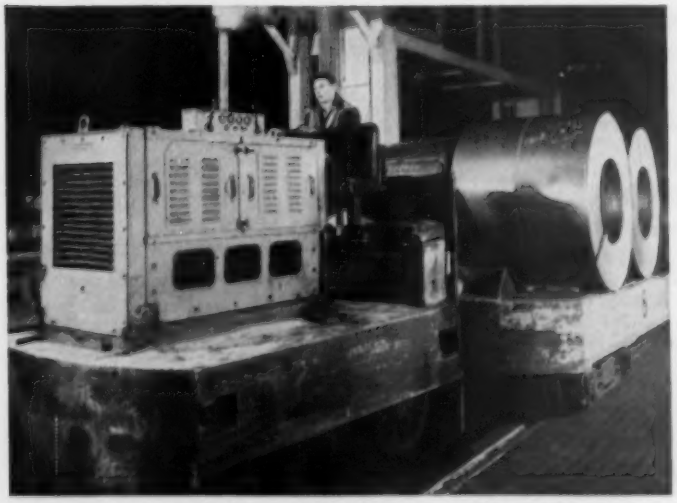


This 80,000 lb. capacity Yale split ram truck moves two 30,000 lb. coils of steel. Powered by Ready-Power diesel electric model RD18DX, the truck is on 20-turn per week duty

Schedules at The Great Lakes Steel Corporation, Detroit Division of National Steel Corporation call for materials handling trucks that operate at top efficiency *all the time*. And experience has shown that trucks equipped with Ready-Power diesel-electric meet performance requirements at economical costs per ton-mile.

A user of Ready-Power gas-electric since 1930, Great Lakes was one of the first to put Ready-Power diesel-electric into service when it was introduced in 1950. Many units have been added since then.

Why not put this full-time power to work in your mill? Write for information.



Ready-Power diesel electric model RD9DX powers the rubber tired Atlas tractor which is shown here pulling transfer cars. Loads can be as high as 125 tons per trip.

READY-POWER

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

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Only COOPER ALLOY insists on 100% x-ray of all vital cast components to guarantee the highest standards of quality in the industry. Our radiographic laboratory processes many thousand large size x-ray plates every month, providing a measure of control unmatched anywhere. When you add to this the most complete program of visual, mechanical and pre-service testing, it's easy to see why Cooper Alloy stainless steel valves have built such a reputation for reliable service.

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Toolmaking:

Graphitic hollow bar offers die and gage economies.

A recent innovation in the steel industry, graphitic hollow-bar tool steel for making dies and gages at The Timken Roller Bearing Co. has resulted in substantial economies to that firm.

Hollow bar tool steel is rough turned on the outside diameter and bored on the inside, in sizes ranging from 4 to 16 in. OD with various inside diameters. The product is available in lengths ranging from 6 to 10 ft.

Machines Faster

Tool room supervisors at Timken have found that graphitic tool steel machines approximately 30 pct faster than other tool steels due to the free graphite in the steel's structure.

Drilling and turning solid bars for dies and other purposes is eliminated since the center hole in hollow bar steel is already there. Wearing qualities of tools made of this material are excellent.

Saved Time, Money

Solid bar stock and forgings were formerly used in the Timken tool room for dies and gages. On a representative group of 10 machining jobs ranging from the machining of a master gage to the machining of a multiple perforating die, the average savings in labor costs were 24 pct.

Time and money saved on some machining jobs were as much as 50 pct. During 1954, Timken's use of solid bar stock for dies and gages decreased by 28 pct while the use of hollow bar tool steel increased by 28 pct.

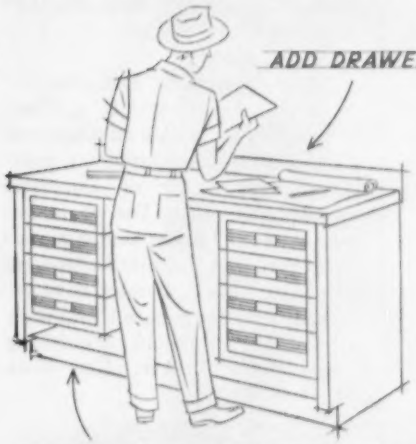
Savings in excess of $56,000 were made by the tool room alone, by using wherever possible, hollow bar tool steel rather than solid stock.

Less tangible savings than the 24 pct average savings on labor costs are: Less wear and tear on machinery, reduced inventory of drills, and speedier delivery of graphitic hollow bar tool steel as compared with forgings.

HOW TO USE STANDARD HALLOWELL CABINET BENCHES AND ACCESSORIES IN PLANT MODERNIZATION

MODEL 608 - STEEL TOP, STEEL BACK PANEL, BOTTOM SHELF, AND CABINET TYPE BENCH LEGS

ADD TOP SHELF



ADD DRAWER TIERS

USE THEM AS INDIVIDUAL BENCHES

ASSEMBLE THEM IN CONTINUOUS LINE

4 TOP MATERIALS, 3 LENGTHS, 4 WIDTHS
4 HEIGHTS - ALL STANDARD

ADD SLIDING DOORS AND SHELVES

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SCREWDRIVERS, NUTRUNNERS and DRILLS

Here's NEW speed and efficiency for YOUR drilling and fastening work—built right into these brand-new Buckeye B Series air tools.

Here's the greater power and capacity, once found only in bulky, heavy tools, but now neatly packaged into compact, lightweight and easy-to-handle Buckeye tools.

Here, too, are the latest advancements in air tool design, like the Buckeye Package Valve, quickly and easily removed—in a single unit—for inspection and servicing. If maintenance is indicated, just slip another valve unit in place and keep the tool on the line! And the fully controllable exhaust deflector that can be positioned anywhere in a full 360° circle to satisfy any tool operator. And the smooth, palm-fit handle, free from objectionable angles and projections, positioned for perfect tool balance.

These and other features that will mean greater productivity on your work are fully described in our new Catalog G-10; your copy is ready now!

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New Books:

"Holes, Contours and Surfaces," is an exhaustive book on the methods and equipment that provide engineered solutions to the toolmaker's most serious problem: the accurate locating and machining of holes, contours and surfaces. An excellently designed and profusely illustrated book. Contains 184 pages of Woodworth hole location tables for converting holes on circles to rectangular coordinates. The Moore Special Tool Co., Bridgeport, Conn., 422 p.

"Tariffs: The Case for Protection," by L. E. Lloyd. In favor of protective tariffs, the author has written to show the far-reaching effects of tariffs on industrial research, progress, wage levels and national defense. Discusses theory of free trade and argues it cannot work in a world of independent sovereign nations. The Devin-Adair Co., 23 East 26th St., New York 10. $3.50. 207 p.

"Aluminum Paint and Powder," by J. D. Edwards and R. I. Wray. Brings you up to date on aluminum paint. Describes manufacture, properties and testing of aluminum powder and paint. Use of aluminum paints in protection of metals and woods are described. Answers most questions you may have regarding aluminum paints and their application. Reinhold Publishing Corp., 430 Park Ave., New York 22. $4.50. 219 p.

"Dimensions and Tolerances for Mass Production," by Earle Buckingham. Offers a new and practical approach to the problem of dimension with tolerances in relation to production design, tool design, gage design, production and inspection. The Industrial Press, 148 Layfayette St., New York 13. $8.00. 164 p.

"Consulting Services," 15th edition. A hand reference book on "who's who" among consulting chemists and chemical engineers. Association of Consulting and Chemical Engineers, Inc., 50 East 41st St., New York 17. $1.00. 110 p.

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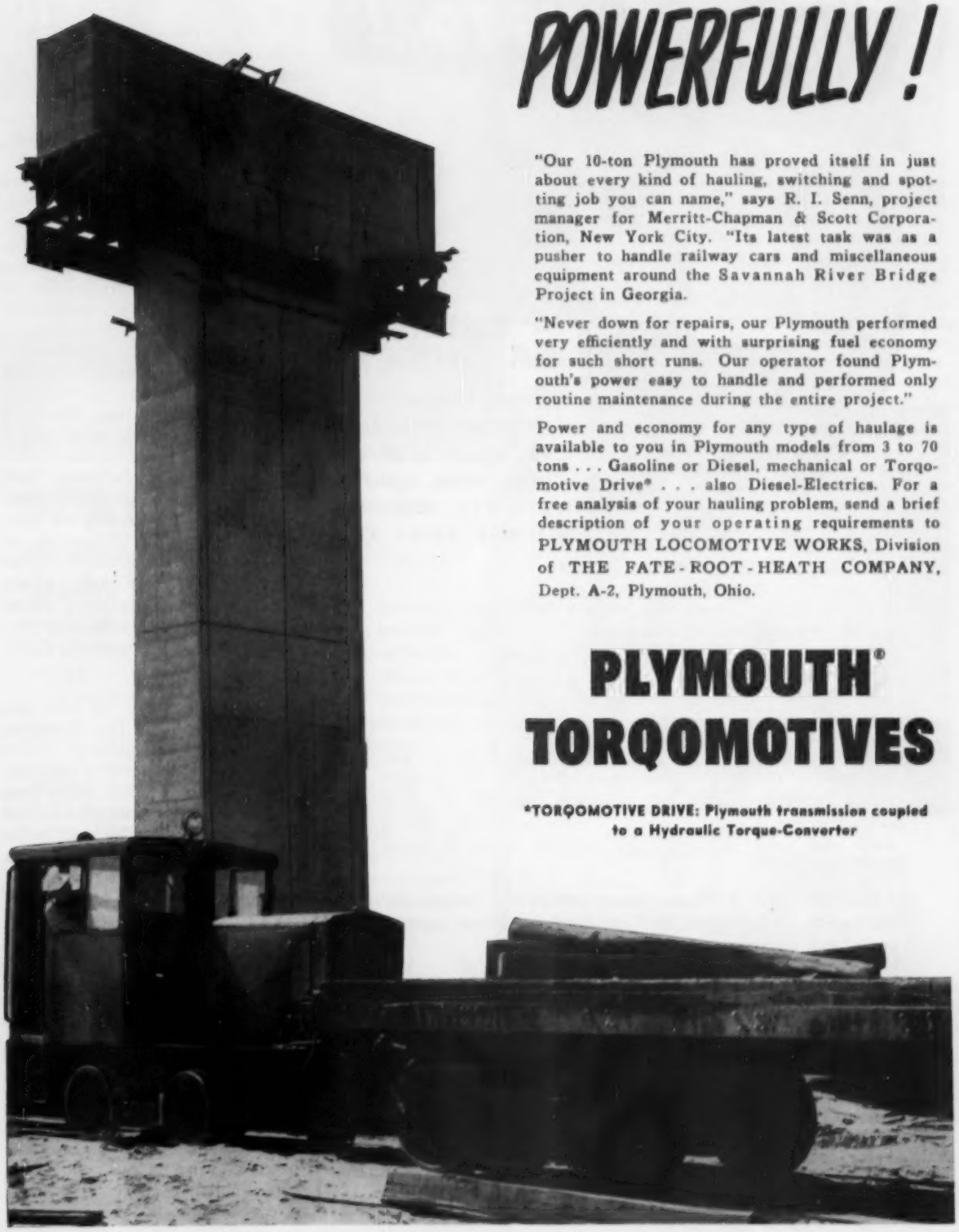

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"Never down for repairs, our Plymouth performed very efficiently and with surprising fuel economy for such short runs. Our operator found Plymouth's power easy to handle and performed only routine maintenance during the entire project."

Power and economy for any type of haulage is available to you in Plymouth models from 3 to 70 tons . . . Gasoline or Diesel, mechanical or Torqomotive Drive* . . . also Diesel-Electrics. For a free analysis of your hauling problem, send a brief description of your operating requirements to PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-2, Plymouth, Ohio.

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*TORQOMOTIVE DRIVE: Plymouth transmission coupled to a Hydraulic Torque-Converter

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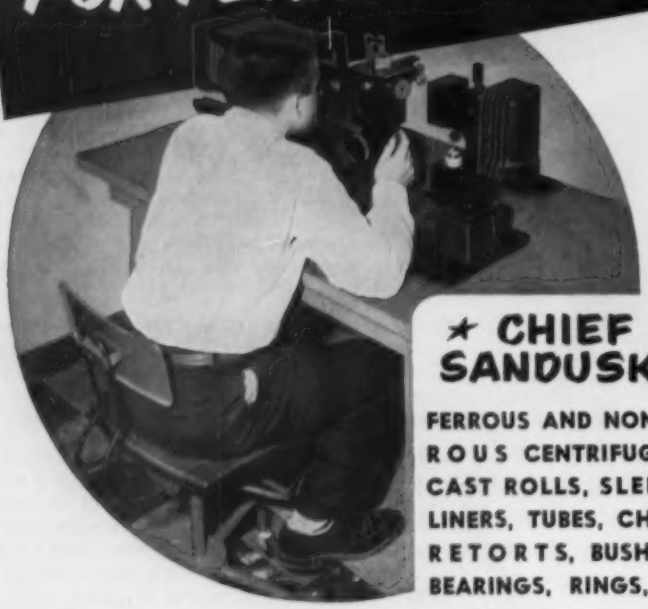

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"English-German and German-English Dictionary for the Iron and Steel Industry," by E. L. Kohler. Springer-Verlag, Vienna, Austria. $6.65. 162 p.

"Pipe Friction Manual." An extension and rearrangement of the pipe friction data originally presented in *"Tentative Standards of the Hydraulic Institute — Pipe Friction."* An essential tool for hydraulics engineers. Hydraulic Institute, 122 East 42nd St., New York 17. $1.75. 87 p.

"Front Line Cost Administration," by W. C. Cooling. Shows the foreman and supervisor how to administer costs in his department. Provides basic industrial engineering ideas to help the foreman recognize and eliminate high cost methods of operation. Conover-Mast Publications, Inc., 205 East 42nd St., New York. $5.00. 259 p.

"The Chemical Industry Facts Book," second edition. This basic reference source on the chemical industry contains 15 chapters on the status of the industry in the American economy and in our daily lives. Manufacturing Chemists' Assn., Inc., 1625 Eye St., Northwest, Washington 6, D. C. $1.00. 148 p.

"Report Writing," by John Ball and C. B. Williams. This thoroughgoing book on business report writing should prove a valuable aid for business people. Not a book of grammar, the book is designed to help you organize and write better reports. The Ronald Press Co., 15 East 26th St., New York 10. $4.75. 405 p.

"New Horizons In Color," by Faber Birren. An intelligent discussion of color and related subjects, including lighting. If you are concerned with the application of color in any phase of business, this book will give you a better understanding of how and why people react to color. It is the complete work of a professional color consultant and has immediate practical value in business. Reinhold Publishing Corp., 430 Park Ave., New York 22. $10.00. 200 p.

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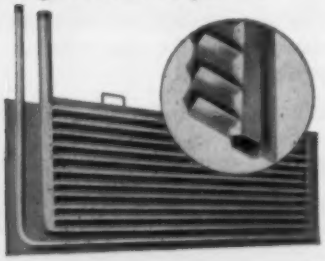
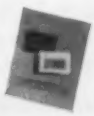
A Tranter Platecoil installed in July, 1952, has *never* had to be removed for cleaning. Previously, two sets of pipe coils were used. One was cleaned while the other was in the tank. The sets were changed every 4 or 5 days. The complete banishment of unproductive downtime in this instance is matched by other types of savings in other installations. In many cases, Tranter Platecoils have reduced warmup time because they actually do transfer heat faster. They have increased tank payloads because they take less space. They have saved maintenance time and money because they are installed on simple hangers and can be removed and replaced much more quickly than pipe coils on complicated racks or brackets. Put Tranter Platecoil's savings to work for you.



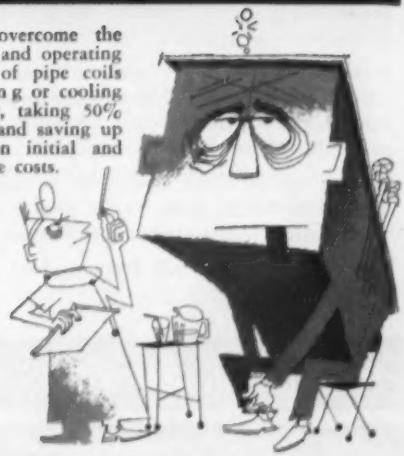


Write today for Bulletin No. P75 See how 12 companies are effecting savings every day by using Platecoils.

PLATECOILS heat alkali tank without downtime.

PLATECOILS cure coil-itis

Platecoils overcome the limitations and operating difficulties of pipe coils by heating or cooling 50% faster, taking 50% less space and saving up to 50% on initial and maintenance costs.



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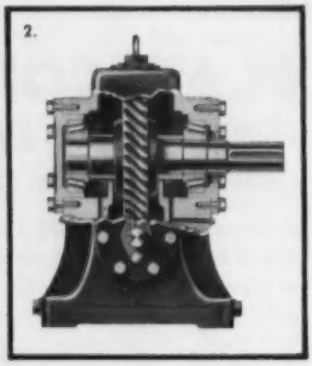

1. Heavy Duty, Type "AT" Reducer, showing the rugged worm and shaft construction; generous ball bearing mountings, and the easy-to-get-at, leak-proof stuffing box.

2. Same Reducer, showing section through worm wheel shaft. Note generous spread of roller bearings, and efficient design of oil wells surrounding bearings.

. . . and we really mean "Precision Built,". . . in fact, we have put as much research, design and skill into these heavy duty reducers, as is put into the finest time-pieces or scientific instruments.

In order to assure the user of Long, Efficient Service Life with lowest possible maintenance, materials and manufacturing standards are very rigidly maintained at "Phillie Gear":

Worms are of alloy steel with carburized hardened and tempered threads; shafts and threads are precision ground and polished after heat-treating.

Worm Gears are made from highest quality chilled-cast nickel bronze.

Housings are oil-tight quality grey iron . . . designed to assure maximum rigidity and heat radiation, with ample oil reservoir.

Units are available with Worms above or below the Worm Gear; also with shafts up or down for Vertical Drives.

A complete range of sizes is available to cover any application up to 265 H.P., with ratios from 3-5/8:1 to 6300:1. They are built to provide efficient and dependable power transmission under the most rigorous conditions over a long period of time.

For detailed information write for latest catalog WG.

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Industrial Gears & Speed Reducers
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Established 1892

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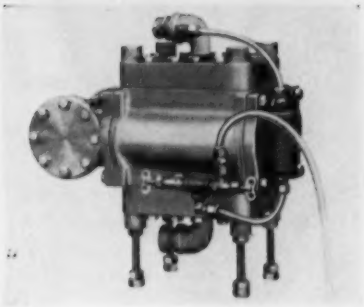


Injects liquids into water in accurate proportions

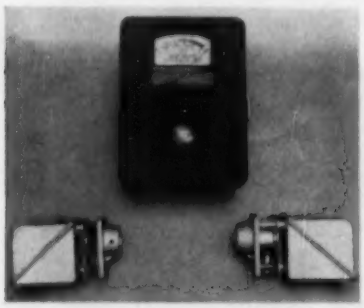
Measure Mix is an automatic device for injecting liquids into water in accurate proportions. The liquid may be a soluble oil as used on machine tools for example, or a chemical solution. The machine requires no outside power connection. It is so constructed that the solution being dispensed remains the same regardless of changes in water pressure or rate of water flow. Two models are available: R-3 takes water that will flow through a ¾ in. pipe line up to 10 gpm; R-8, a 2-in. pipe line, up to 100 gpm. Proportions range 1 in 25 to 1 in 200 and 1 in 100 to 1 in 500, respectively, for the models. *Smith Precision Products Co.*

For more data circle No. 29 on postcard, p. 113.

Get bigger loads, easier; carry bigger loads, lower

Two different four-wheel-drive Payloader tractor-shovels, HU and HH models, have 1 and 1½ cu yd heaped - capacities, respectively. The design permits 40° of bucket breakout at ground level rather than at 3 or 4 ft carry position. To obtain maximum loads with a minimum of effort, a powerful pry-out action is accomplished by using breakout pads on the ground as a fulcrum for leverage. Combination underslung boom-arm design and positioning provide driver visibility and safety. Both units have sealed, pressurized hydraulic systems. *Frank G. Hough Co.*

For more data circle No. 30 on postcard, p. 113.



Indicates smoke discharge, combustion efficiency

A light source, a photoelectric scanner, and a smoke density indicator comprise the Fireye smoke density indicator system FE-3 for keeping smoke discharge within limits of all smoke control and air pollution ordinances. Light source and scanner are installed on the stack or breeching so that the light beam is aimed directly at the lens of the scanner. Density of smoke obscuring the light beam is indicated in terms of both smoke density and Ringelmann Number. An alarm relay provides for the operation of an external alarm at any preset value of smoke density. *Combustion Control Div., Electronics Corp. of America.*

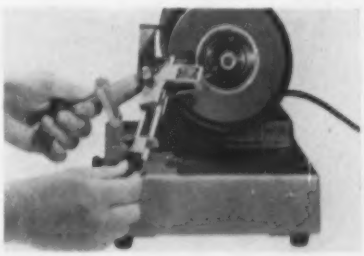
For more data circle No. 31 on postcard, p. 113.

New kit takes guess work out of drill sharpening

New, scientifically engineered drill sharpening kit enables anyone to sharpen twist drills quickly, easily and accurately. The kit consists of a drill grinding attachment which holds the drill to be sharpened in a sliding V block; the rocker plate which has a drill gage plate, gage plate set screw, and handle; a heavy metal base; Swanson 3-way drill point gage; and an instruction manual. The drill sharpening kit is used with a 6-in. bench grinder which is mounted on the metal base. *Swanson Mfg. Co.*

For more data circle No. 32 on postcard, p. 113.

Turn Page



How you can save time and money when your blueprint calls for

STAINLESS STEEL PLATE

When your blueprint calls for stainless steel plate, you'll want material of highest quality, produced by specialists in the field, and delivered to you on time. When you want all that, and economy too, you'll find the answer at G. O. Carlson, Inc.

As one of the leading producers of stainless steel plates, heads, rings, forgings, flanges, and other stainless components, G. O. Carlson, Inc. uses the finest equipment in the industry to fill your orders quickly, efficiently and economically. Clean edges are a rule of the road with G. O. Carlson, Inc. which means a minimum of "trueing up" before fabrication. Plates will be rolled promptly to fill special orders, but many of your requirements can be filled from what is probably the largest stock of controlled analysis stainless steel plate available anywhere.

Call Carlson the next time your blueprints specify stainless steel plate or other stainless steel products.

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G. O. CARLSON, INC.

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THORNDALE, PENNSYLVANIA
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Turret press has assorted die sizes and punch

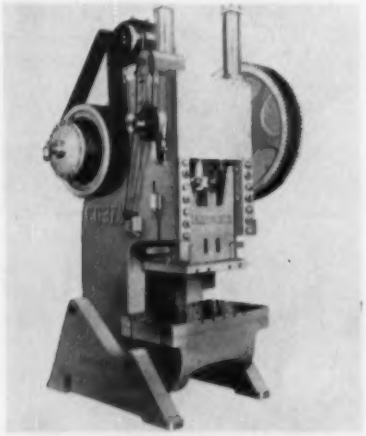
New 10 gage power turret was designed to service aircraft by having assorted sizes of 20 dies and punch which could be rotated into operating position in a fraction of a second. A conventional electric foot switch is provided. Also a special handwheel at front permits the operator to lower the punch into a template or on to center punched mark and sheet. After a predetermined amount of lowering of the punch by hand, the machine power-punches the selected hole. Four micro switches are connected in series so that the machine cannot operate unless rotating turrets are locked in place. Specifications include depth of throat, 28 in.; maximum hole 2½ in. in 10 gage; 20 stations; all electric controls. *Diamond Machine Tool Co.*

For more data circle No. 33 on postcard, p. 113.

Low cost atmosphere for bright hardening, annealing

A new endothermic gas cracking generator automatically produces inexpensive atmosphere for bright hardening, bright annealing, or bright copper or silver brazing of medium and high carbon steels. It is completely wired, piped and assembled in a package unit. Available in 500, 750 and 1500 cfh sizes the Hyen Hydryzing Generator provides production economies and is said to give better, more precise operation with ease of maintenance. The air-gas ratio, to produce the desired atmosphere, is set by means of a graduated knob on the carburetor of the mixing machine. The completely reacted, dry, hot atmosphere can be piped directly to the heat treating furnace or it can be cooled in the gas cooler for metering and distribution purposes where more than one heat treating furnace is to be supplied. *Lindberg Engineering Co.*

For more data circle No. 34 on postcard, p. 113.



Open-back press conforms to JIC standards

New 200-ton open back inclinable press with box type ram, counterbalanced, is built to completely conform to press standards set up by the JIC. The press has as standard equipment, the new air-powered, electrically controlled friction clutch with interconnected brake and single point adjustment, providing a quick and accurate control for such presses requiring start-stop operation. Design of the interconnecting assembly permits quick, simple, positive single-point brake adjustment. The same press is made in 110 and 150-ton models, all three designed to meet the specific requirements of cutting, punching, stamping, shallow drawing and forming operations. These presses will accommodate any type automatic or semi-automatic feed attachments. The new box type ram itself is a high tensile semi-steel casting. A bar-type knock-out can be accommodated. Lubrication is automatic on all three presses in the series. *Ferracute Machine Co.*

For more data circle No. 35 on postcard, p. 113.

Hardens steel parts and tools in a few minutes

Heat treating can be "painted on" steel parts and tools. It is no longer necessary to soak these parts for hours in furnaces at high temperatures. Only a few minutes near the critical temperature of the steel is required under this process to obtain a hardness of 60 Rc, and a depth of 0.003 to 0.010 in. Greater depths of 0.015 to 0.020 can be obtained in 30 to 45 min. Hardness and depth are obtained through use of liquid Armor-Tuf. It is painted on gears, cams, studs, tools, etc. After being dried, the pieces are placed in the furnace, and brought up to 1400° to 1600°F, with the above results. Process permits a continuous line operation. Parts may be dipped or sprayed if desired. *Armor-Tuf Sales Corp.*

For more data circle No. 36 on postcard, p. 113.

Turn Page

Whatever your gear requirements may call for with respect to size, type of basic material, accuracy, quantity, delivery schedules . . . a call at Perkins today can bring you many more practical reasons why, for precision custom-made gears, it's a good idea, and good economy too to CALL PERKINS FIRST for quotations!

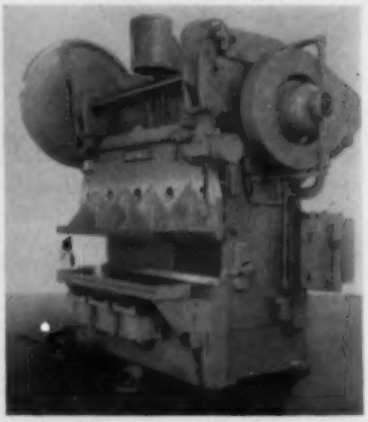
PERKINS MAKES: bevel gears, ratchets, sprockets, ground thread worms, spiral gears, helical gears, spur gears with shaved or ground teeth.

NOTE: The PERKINS PRECISION SPRING COILER is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire sizes .005 to .125. Diameter, from 3/32" to 12" and larger. Size of the compact coiler is only 7½x16".
A POWER MODEL is available. Information on request.

Perkins Machine & Gear Company
103 Circuit Avenue, WEST SPRINGFIELD, MASS.

All steel press brake

Shallow draw work and various types of press operations can be performed on this all steel press brake. The machine has a 36-in. permanently wide bed and ram with a shut height of 15 in., and 8 ft overall die surface, and six 12-in. air cushions mounted on the



underside of the bed, both front and back. The press brake weighs 17 tons; is equipped with an air electric clutch with automatic stop and non-repeat. Two foot pedals operate as one unit or separately. Special 2-speed transmission operates at 13 and 30 strokes per minute. *Cincinnati Shaper Co.*

For more data circle No. 37 on postcard, p. 113.

Tubing harness

Corrosion-proof, multiple-line instrument harness of ribbon construction consists of 10 copper or aluminum tubes. Each tube is individually encased in its own chemically resistant plastic sheath

which is attached to the adjacent tubes by a perforated plastic web. One or more individual tubes, or group of tubes, can be stripped from the ribbon without tools and without destroying the protective coating. *Dekoron Products Div., Samuel Moore & Co.*

For more data circle No. 38 on postcard, p. 113.

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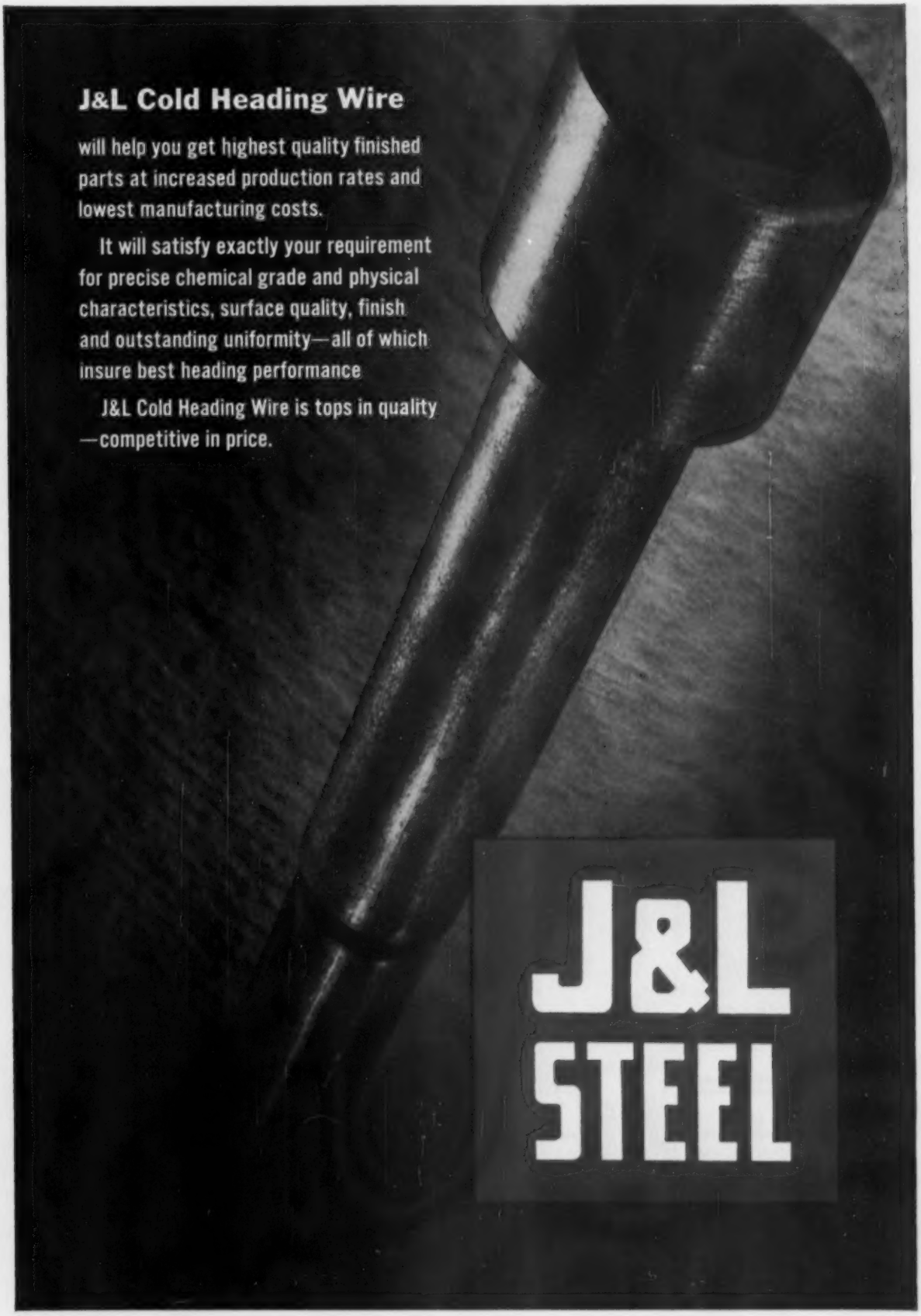
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will help you get highest quality finished parts at increased production rates and lowest manufacturing costs.
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J&L Cold Heading Wire is tops in quality —competitive in price.
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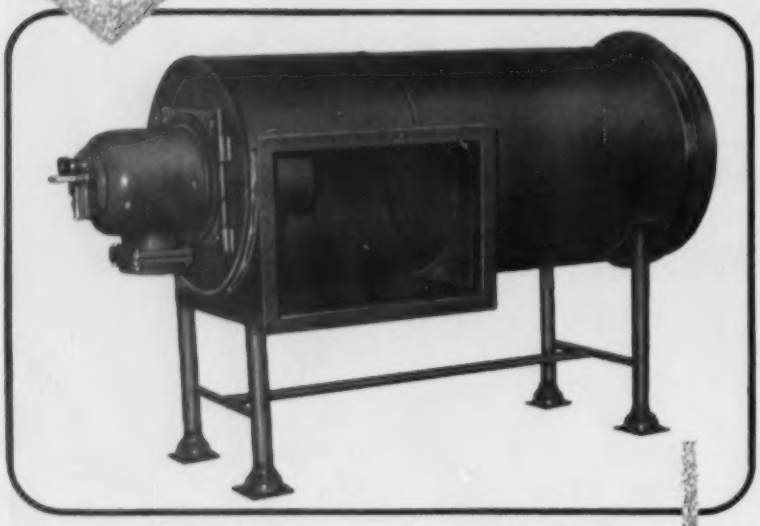
STEEL

THERMAL TYPE CA
DIRECT FIRED AIR HEATERS



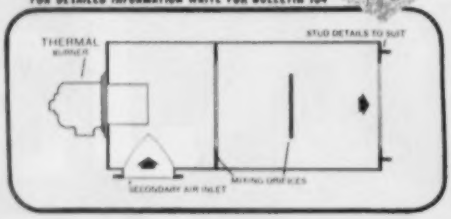
COMPACT . . . EASILY INSTALLED

Readily fitted to ovens, kilns, spray dryers, etc., the THERMAL Type CA Air Heater is an ideal source of heat where products of combustion may be mixed with the air. Oil, gas or combination firing is available without change in heater construction.

NO REFRACTORY REQUIRED . . .

The THERMAL High Velocity Burner built into the heater permits combustion to be substantially completed within the burner itself. Thus the heater is basically a mixing chamber wherein the products of combustion are mixed with the air being heated. Refractory is not normally used. Successful applications have been made ranging from under 200,000 BTU/hr. to over 20,000,000 BTU/hr. and at all pressure levels.

FOR DETAILED INFORMATION WRITE FOR BULLETIN 104



UNITIZED CONSTRUCTION

Initial cost and upkeep is kept at a minimum through the use of all welded, all metal construction. The CA Air Heaters are normally supplied as complete "package" installations.

OTHER THERMAL PRODUCTS & SERVICES → Gas, Oil & Combination Gas-Oil Burners • Heat Exchangers • Submerged Combustion • Combustion & Heat Transfer Engineering

THERMAL

Thermal Research & Engineering Corp.

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REPRESENTATIVES IN PRINCIPAL CITIES

Large thread grinder

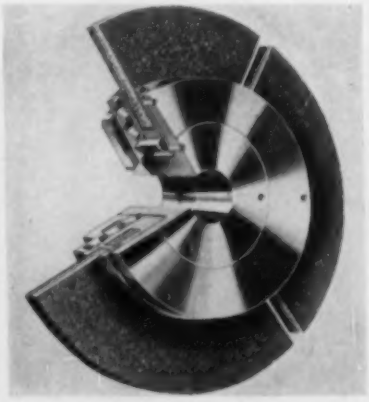
A machine that will grind long threads on such parts as aircraft actuator screws and machine tool lead screws has been developed. The new machine, Style 120 Ex-Cell-O precision thread grinder, will grind 10 ft of thread length in one setting, will accommodate

work up to 12 ft long between centers, and will hold close tolerances on form, pitch diameter and lead. Automatic features include feed to finish size, grinding wheel dressing with resumption of grinding cycle after, control of coolant flow, lubrication, and retracting the grinding wheel at end of grinding cycle. *Ex-Cell-O Corp.*

For more data circle No. 39 on postcard, p. 113.

Constant diameter

Increased efficiency and decreased grinding costs are claimed for this constant diameter Kodiak grinding tool. Adjustable hub of the tool holds abrasive segments which are

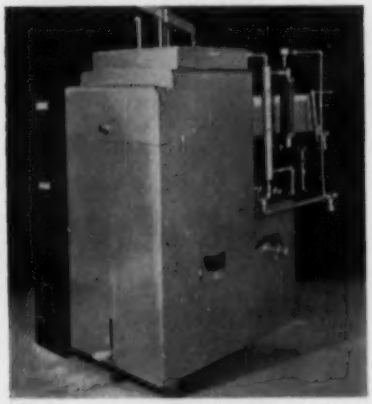


locked into place by the same method as a scroll chuck. Constant peripheral speed is maintained by slightly increasing diameter of tool before each wheel dressing. Open slot between abrasive segments acts as air or coolant pump, directs air or coolant onto surface being cut. *Continental Products, Inc.*

For more data circle No. 40 on postcard, p. 113.

Modified for brazing

An electric high-temperature furnace has been specially modified to incorporate a controlled - atmosphere cooling chamber. The chamber is water-cooled and is completely integrated with the furnace. Capable of producing temperatures up to 2400°F, the furnace is suited



for brazing operations and heat treatment of all high-speed steels including cobalt type. The small furnace has a working space 8 in. wide, 6 in. high x 14 in. long. It occupies negligible floor space and is mounted on wheels for moving to new locations. *Waltz Furnace Co.*

For more data circle No. 41 on postcard, p. 113.

Plate holders

New design widens the applications for Luminum-Line plate holders. Model LP-3S is a three line holder which includes a combination of single character and multiple character steel stamps to handle name identification, heat number,

serial number, tensile, etc. Individual spring plunges retain the stamps in the holder, but spring tension is controlled so the stamper quickly can pull a stamp out and insert a new one for any changes required. Aluminum body reduces weight 40 pct. *M. E. Cunningham Co.*

For more data circle No. 42 on postcard, p. 113.

Turn to Page 136

STOCK HOUSE OR HIGH LINE

operators prefer the

DEPENDABILITY of ATLAS CARS

These specially designed units are another example of the ruggedness of Atlas Cars. Their dependability helps maintain the most rigid furnace charging cycles.

40-TON SCALE CAR
Double Hopper Bottom Dump

75-TON ORE TRANSFER
Gable Bottom Double Side Dump

THE ATLAS CAR & MFG. CO.

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CRANES *SPEED* PALLET-HANDLING

Store More—Eliminate Congestion—Cut Maintenance—Save Floors

Pallets loaded with motor stator laminations are easily lifted and moved with these floor-operated Tramrail cranes. Note that the entire area is jam-packed, with no lost aisle-way space. The ease with which any loaded pallet can be picked up and handled to awkward-to-reach places is a distinct advantage.

Pallets with 32 100 lb. kegs of nails are piled high in storage with the cab-operated Tramrail crane and open-side pallet lift.

THERE'S no height limit when stacking palleted materials with Tramrail cranes. 20 ft.—30 ft.—40 ft. or higher are easy. Your materials and building are the only limiting factors.

Often 50% and more materials on pallets can be stored in a room served by overhead cranes. Narrowing of some aisles, elimination of others, plus higher and closer piling make the difference.

Pallet loads are moved safely and speedily overhead where the path is always clear and unobstructed. Placing this handling job near the ceiling, reduces floor congestion and frees much of it for other purposes.

Maintenance costs for Tramrail cranes are extremely low, usually only a few percent of that for power-operated floor trucks. No engines to overhaul. No clutches to replace. No brakes to re-line. No batteries to charge. No irritating gas fumes. And of importance, extra heavily reinforced floors are not required and costly floor damage because of materials handling is eliminated.

When considering pallet handling or any materials handling, it will pay you to look into the tremendous advantages that Cleveland Tramrail cranes offer.

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CLEVELAND TRAMRAIL DIVISION

THE CLEVELAND CRANE & ENGINEERING CO.

4878 EAST 284 STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

ILLINOIS GEARS

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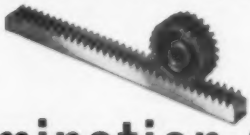

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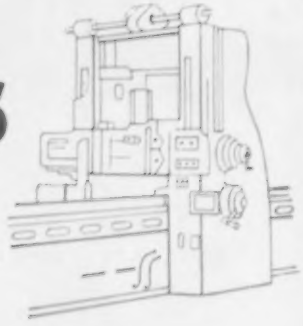

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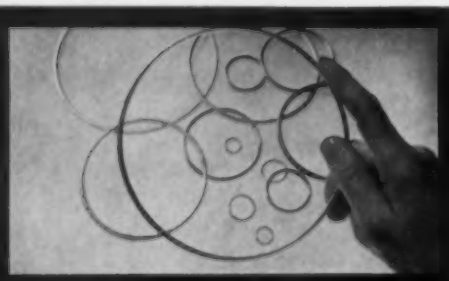

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2. Stainless Steel — Type 321 (Standard)
3. Al. Alloy 35 (Spec. WW-T-788) (Special)
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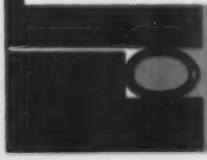
5. Inconel (Special)



UNITED AIRCRAFT PRODUCTS, INC.
Box 1035, Dayton 1, Ohio

Vibration isolator

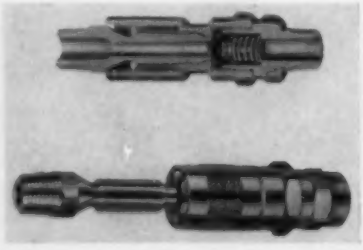
New, compact, high capacity steel spring vibration isolator provides maximum isolation efficiencies. LM/Vibro isolator is extremely rugged, and carries loads of over 17,000 lb each. Housing is a specially annealed, malleable iron cast-

ing for heavy duty service. Its adjustable leveling bolt eliminates shims and speeds up installations. It is available with regular, external adjustment for the majority of installations, or with internal adjustment for use under machines having no fastening bolt holes. *Korfund Co.*

For more data circle No. 43 on postcard, p. 113.

Pneumatic coupling

A new coupling utilizes a modified collet principle for instant locking and unlocking. The coupling when engaged is free to swivel yet has 80 pct of the plug shoulder in complete contact with the collet fingers. The coupling is used on pneumatic



and fluid applications; has foolproof engagement even under adverse conditions, it is stated. Stock couplings are available in single valve construction with many styles of threaded ends and hose attachments. Double valve and straight through are available on special order. *R. S. Corcoran Co.*

For more data circle No. 44 on postcard, p. 113.

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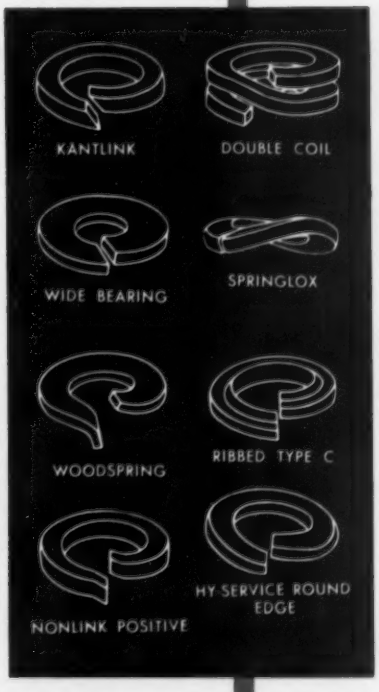
Tight Fastenings Require Constant Tension . . . use Dependable RELIANCE Spring Lock Washers



Reliance Spring Lock Washers are available for the job, wherever constant tension is required in bolted assemblies. In order to meet the demand for special fastening applications, Reliance has developed various type Spring Washers to meet exacting specifications. These Spring Washers, as illustrated, are now in stock to help solve your fastening problems before they get started.

Scientifically engineered Reliance Spring Lock Washers will keep the bolted assemblies of your products tighter longer.

Send for Engineering Bulletin W-50 for a look at the complete line. No obligation, of course.

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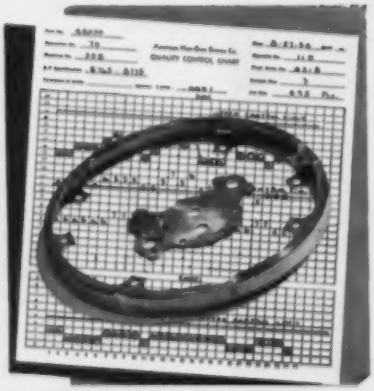

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EVERY week and let the

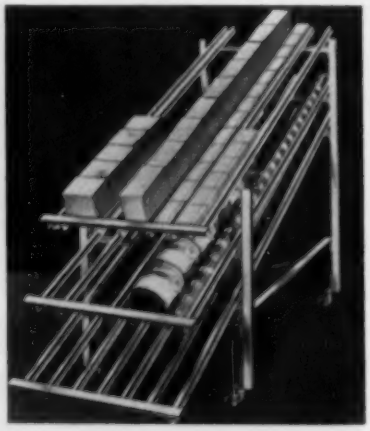
Digest of the Week in Metalworking

help you find your favorite features.

IT PAYS TO READ IRON AGE ADS TOO!

Stock selecting rack

Items that will slide or roll may be handled for easy order picking by a new, portable stock selecting rack. Known as the Caravan rack it holds over a 150-ft long supply of 21 or more different items. It is mounted on four rubber-tired swivel casters so that it can be

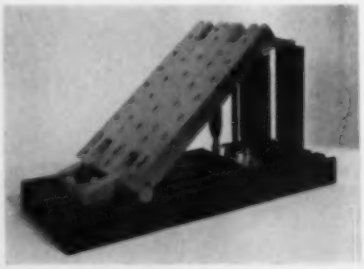


readily moved to any location. Several racks, placed in an arc, enable one operator to reach hundreds of items. Three adjustable shelves can be raised or lowered to vary the angle of slope or the distance between shelves. *M-H Standard Co.*

For more data circle No. 45 on postcard, p. 113.

Sine plate

For rugged use in machining operations a new sine plate incorporates large size, low initial cost and quick setup with maximum



rigidity. The plate is cast of high strength, shock absorbing Meehanite metal and ground to close tolerance for parallelism between the top surface and the centerline of the hardened and ground steel rolls. A special clamp performs the function of squaring the plate

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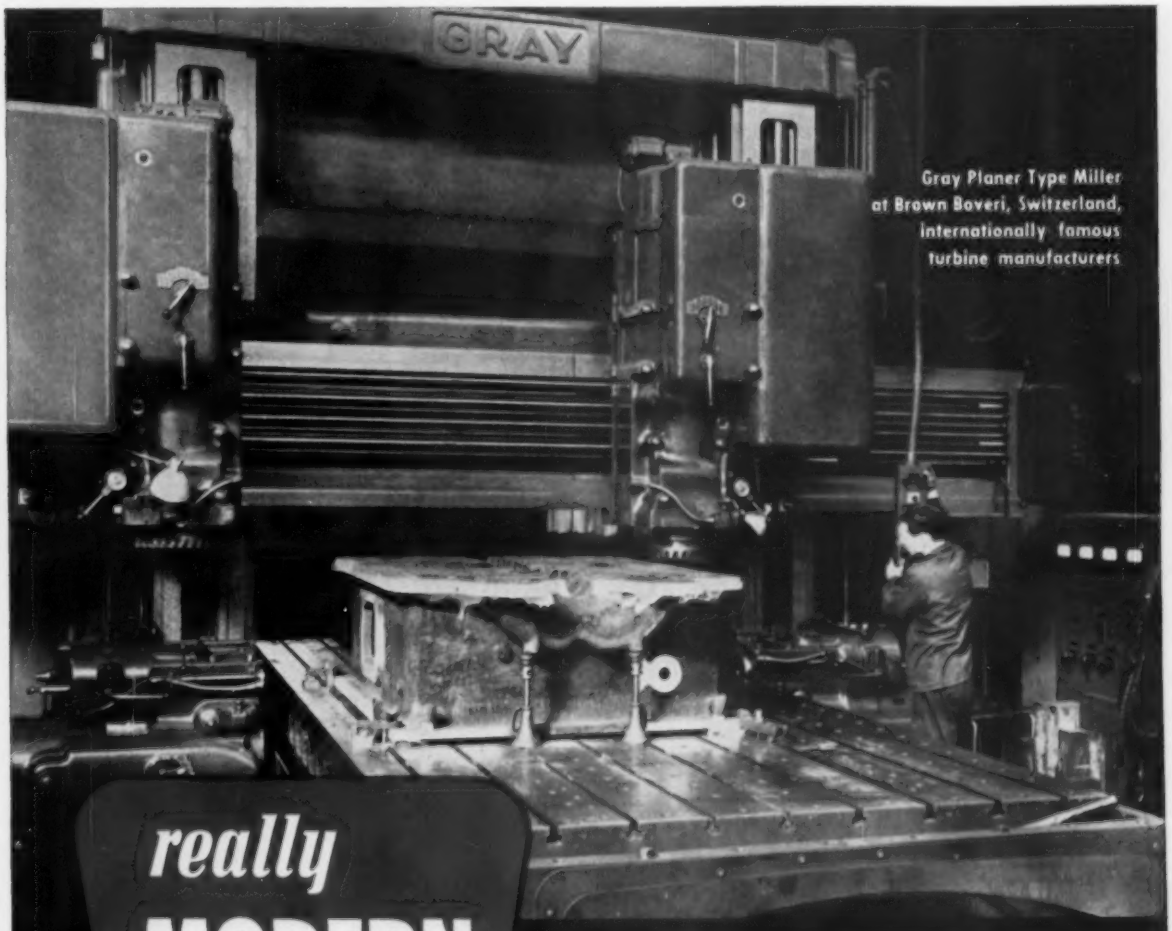

Gray Planer Type Miller at Brown Boveri, Switzerland, internationally famous turbine manufacturers

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with finger tip control

● **GRAY PLANER TYPE MILLERS** with their modern unit head design are setting production records in shops all over the world. The Unit Heads with individual spindle motors make possible a wide variety of simultaneous high horsepower cuts. (Swivel or non-swivel heads are available as desired). The Low Hung Drive to spindle thru a balanced planetary gear train with fly wheel inertia provides the ideal high horsepower carbide cutter drive. Speeds up to 1000 RPM instantly obtainable by the flick of a lever. Terrific power to answer any demand is always at your finger tip. Its performance will prove to you that . . .

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THE PERFECT *PRESSURE* LUBRICANT!

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EMBECO *non-shrink* GROUT

for setting heavy equipment

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with the machine tool tables as well as clamping the pivot roll. Rigidity of the clamping method allows heavier feeds and deeper cuts. Three size plates are available: 12x8 in.; 15x10 in.; and 20x13 in. *Denco Machine Products.*

For more data circle No. 46 on postcard, p. 113.

Precision oscilloscope

Useful for production test setups where work can be placed in front of the operator during test, the console oscilloscope utilizes a 17-in. rectangular tube. The work shelf is at convenient desk height

and face of the oscilloscope tube is inclined at an angle for maximum viewing ease and operation of controls. All 1700 Series Models of the large screen oscilloscopes can be installed in this modern console type cabinet for greater convenience of the operator. *Electro-mec, Inc.*

For more data circle No. 47 on postcard, p. 113.

Emulsion cleaner

Brooks Rollene E. C. cleans both ferrous and nonferrous metals, removing foreign substances from metal sheets prior to processing of finished product in stamping plants. Grit and dirt, fine metal particles from shearing or blanking and other contamination picked up in handling can be removed. The material is used in circulating systems and readily soluble in hot or cold water. A 9:1 solution of Rollene E. C. with tap water makes a stable cleaning solution. It cleans by a penetrating action, creeping under foreign material and floating it away. *Brooks Oil Co.*

For more data circle No. 48 on postcard, p. 113.

IN ANSWER TO THE GROWING DEMAND FOR
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Cold rolled Carbon and Stainless Steel Belt Conveyors for Material Handling and Processing.

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- **Wide range of sizes in stock — —or slit to your specifications**

Ask your nearest Sandvik office for further information or technical assistance.

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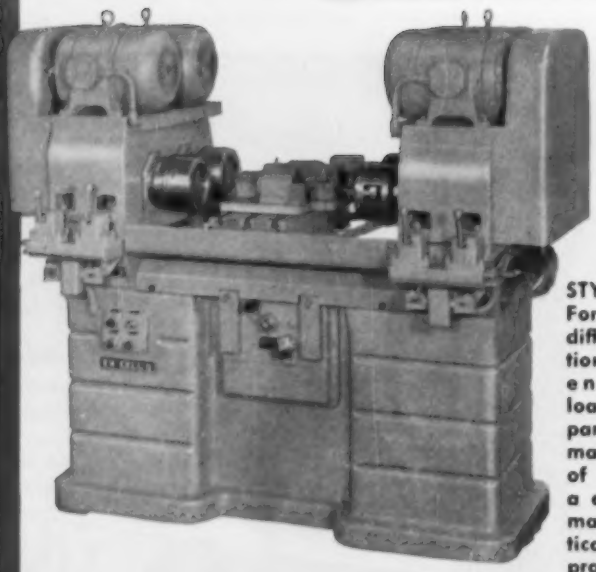
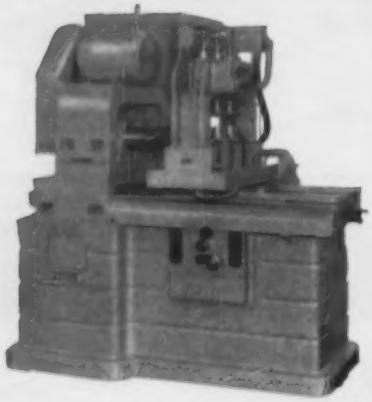
STYLE 2112-A. Single-end model for work pieces in the small and medium-size range. Flexible hydraulic controls give easy adjustment of multiple operations.



STYLE 1212-A. For identical or different operations at each end. When loading time of parts approximates the time of machining, a double-end machine practically doubles production.



STYLE 112-C. Large and sturdy with long stroke. Accommodates medium and heavy work, gives maximum precision production, minimum operating cost.

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Ex-Cell-O Precision Boring Machines

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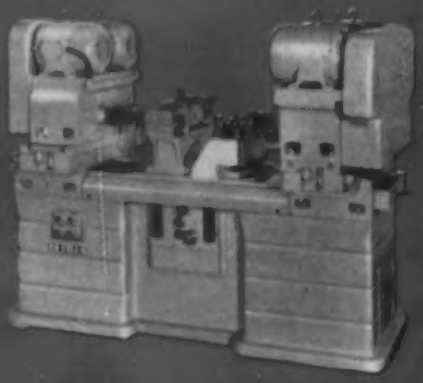

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You can precision-bore, turn, face, counterbore, chamfer, or groove with these fast, sturdy, flexible EX-CELL-O machines.

These are standard machines that handle many kinds of precision operations. EX-CELL-O has the *standard items of tooling* to make this possible at minimum cost.

Any EX-CELL-O Precision Boring Machine will give you *precision work at maximum production* speeds, with a minimum of investment.

Get all the facts about them from your local Ex-Cell-O representative, or write for a Precision Boring Catalog.

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55-18

The Iron Age SUMMARY . . .

Steel consumers and producers face vacation and maintenance slowdowns . . . Ingot rate will ease . . . Order rate high.

Day of Reckoning . . . Steel producers have pushed production facilities about as far as they can for the present. The day of reckoning is near on maintenance. Important maintenance shutdowns in the near future are inevitable. Warning signals are beginning to flash.

Combine this with the normal summer vacation and hot weather production problems, and the outlook for the immediate future is far from what steel consumers would like it to be.

Order Volume High . . . Production will back off from current near-capacity operations. Before the mills have disposed of maintenance and vacation disruptions, the ingot rate will drop a few points from present levels.

On the other side of the coin, there will be little if any letup in order volume, which is currently running ahead of capacity. As a result, order backlogs will continue to mount and delivery promises will be broken.

Demand-Supply Outlook . . . With third quarter already spoken for and fourth quarter filling rapidly, the maintenance-vacation bugaboo will aggravate the tight demand-supply picture over balance of the year. On some products, mills are running 30 days or more behind on deliveries.

The maintenance problem already is beginning to crop up in some producing districts, and the ingot rate in those districts is suffering. Scheduled production rates are not being maintained, although the national pace is holding steady this week at 97 pct of capacity.

Pressure on Warehouses . . . Normal mill customers are turning more and more to higher-priced warehouse steel to fill in tonnage gaps. As a result, warehouse inventories are showing signs of imbalance. Mills report that warehouses in turn are increasing pressure for delivery.

The pressure for warehouse steel is as good a sign as any that consumers generally have been unable to do any inventory-building. Otherwise, a delay in delivery from the mills would not create the emergency shortages that have forced some users to pay warehouse prices.

Year-end Outlook . . . Some third quarter business is certain to carry over into fourth quarter, which virtually guarantees a good production rate at year end. In fact, some consumers would be willing to place business for first quarter 1956 if the mills would accept.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,340	2,340	2,292	1,674
Ingot Index (1947–49 = 100)	145.5	145.5	142.5	104.2
Operating Rates				
Chicago	99.5	98.0*	99.0	83.0
Pittsburgh	99.0	99.0*	99.0	68.0
Philadelphia	98.0	97.1	98.0	59 0
Valley	98.0	98.0	96.0	70.0
West	100.4	100.2*	95.5	75.0
Detroit	96.0	94.0*	86.0	83.0
Buffalo	105.0	105.0	105.0	67.5
Cleveland	103.9	101.4*	109.9	66.0
Birmingham	96.0	93.5	90.0	71.0
S. Ohio River	92.1	88.8*	90.7	82.5
Wheeling	95.0	101.0*	93.0	76.0
St. Louis	106.1	106.1	106.1	64.5
Northeast	90.0	89.1*	89.0	63.0
Aggregate	97.0	97.0	95.0	70.5

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	$56.59	$56.59	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$34.00	$34.33	$35.67	$28.25
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	36.00	36.00	36.00	30.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Magnesium, ingot	29.25	29.25	29.25	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	91.375	91.375	91.375	94.00
Zinc, E. St. Louis	12.00	12.00	12.00	10.25

Market Demand Remains Solid

Despite some falloff in merchant wire, market rides high for most products . . . 4th quarter scheduling is becoming prevalent . . . Year's balance looks solid.

◆ APART FROM a slight easing in merchant wire demand, the steel products picture this week was one of acceleration in some products and continued strength in others.

Cleveland reported that mills in the area are disappointed over the volume of merchant wire business and are talking in terms of a slower-than-normal year. This is not necessarily the whole story, however. In Chicago there is no sign of a letup in demand for merchant wire products and virtually all mills there are operating at capacity.

Plate and structurals can be classed as tight. As the construction season approaches its peak, structurals appear to be moving into the shortage category with plate.

Sheets, strip, bars, tin plate, manufacturers' wire, oil country goods, merchant pipe, stainless, electrical sheets, and galvanized—all in good demand.

Warehouse buisness is booming. Mills report that distributors are practically on bended knee for sheet and strip. It looks as though there's inventory trouble ahead for some warehouses. Reason is that in addition to their regular customers the warehouses have been besieged by desperate consumers who normally buy from mills but who have been caught short by slow mill deliveries. Result is that in the Chicago area the average warehouse order is up sharply, is now running at 2200 lb.

Bethlehem Pacific Coast Steel Corp. has put a new hot dip wire galvanizing unit into operation to handle 5/16-in. to 18 ga product.

The big South Works of U. S. Steel Corp. lost 7000 tons of product last week due to a water main break.

SHEETS AND STRIPS . . . **Chicago** reports that unless 3rd quarter activity falls below present levels, 4th quarter will again be an allotment proposition in hot- and cold-rolled sheet, possibly in strip. Strip is now being booked into 3rd quarter and integrated mills are sold out for the period. Some 4th quarter cold-rolled sheet orders have been placed in **Detroit** with some customers proposing deliveries for 1st quarter, 1956. Some stainless is still available for 3rd quarter, with automakers keeping up a steady pressure for more. In **Pittsburgh**, 3rd quarter order books are virtually filled with several producers accepting 4th quarter business only. Hot-rolled sheets are a bigger concern to consumers than cold-rolled, particularly for 3rd quarter delivery. It's expected that sheets will be tight through 3rd quarter on the **West Coast**, while in **Cleveland** some consumers talk about 1st quarter '56.

BARS . . . In **Detroit** one reason for slow deliveries, according to one producer, is that automakers aren't giving enough notice when they place an order. Bars are not sold out for 3rd quarter, but mills are filling up fast. July and August are solid. Hot-rolled items are booked through 3rd quarter in **Chicago**. Cold finished volume remains at record levels with very low stocks of hot-rolled bar among cold finishers. Formerly strong warehouse stocks are beginning to lower rapidly with no early relief in sight. **Pittsburgh** reports hot- and cold-rolled products are in strong demand for 3rd quarter delivery.

PLATES . . . Practically all mills in **Pittsburgh** report 3rd quarter order books filled. If additional ingots should be released from production of other grades, there is still some production facility available to gobble it up. In **Chicago** plate is a shortage item. Shortage is likely to keep up through all of 3rd quarter, possibly into 4th. Barring an auto strike, **Detroit** warehouses look for continued good business through July if they are able to replace stock. In the **East** producers are scheduling August delivery, have not opened 4th quarter order books as yet.

STRUCTURALS AND SHAPES . . . One **eastern** producer reports structurals are now out to 16 weeks' delivery time. Mills are hard pressed at the moment to keep up with production on current order bookings. **Pittsburgh** reports that present facilities are not adequate to fill demand through 3rd quarter. Full production seems assured on all grades throughout the year. In **Chicago** wide-flange beams are sold out for 3rd quarter, will probably be an allocation item in 4th quarter. Light structural stocks at warehouse level are falling and in some cases getting as tough as sheet and plate. In **Cleveland** canceled mill customers are beginning to line up in increasing numbers for structurals and light plate at warehouses.

PIPE AND TUBING . . . In the **East** delivery time on oil country pipe is into late Sept. for one producer. Delivery on seamless specialties is running between 5-7 weeks. **Pittsburgh** reports full order books for seamless tubing for 3rd quarter.

WIRE PRODUCTS . . . Merchant wire business, expected to mushroom this summer on top of heavy manufacturers wire demand, is not so great in **Cleveland**, although **Chicago** reports continued strength. **Cleveland** business for the year is now expected to be below normal. One producer reports May schedules still open for fence, bailing wire, netting. Other mills have time open for June. Major portion of output is going into inventory in hopes things will pick up. Spring wire demand in **Detroit** is solid, deliveries slow.

Purchasing Agent's Checklist

MARKETS: West Europe's economic surge gives U.S. new, expanded markets ..... p. 51

TRUCKS: Manufacturers pay more attention to liquefied petroleum gas ..... p. 54

RAILROADS: Lightweight metals, streamline design give railroads "new look" ..... p. 59

MACHINE TOOLS: Automakers detail their needs in machine tools ..... p. 79

Comparison of Prices

(Effective May 24, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	May 24 1955	May 17 1955	Apr. 26 1955	May 25 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.515
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stain'ls C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. terne	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

	May 24 1955	May 17 1955	Apr. 26 1955	May 25 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$34.50	$35.50	$30.50
No. 1 steel, Phila. area	*35.00*	36.00	37.00	22.75
No. 1 steel, Chicago	32.50	32.50	34.50	31.50
No. 1 bundles, Detroit	27.00	27.00	29.00	28.50
Low phos., Youngstown	35.50	35.50	39.50	31.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	43.50	43.50
No. 1 mach'y cast, Philadel'a	44.50	44.50	44.50	39.50
No. 1 mach'y cast, Chicago	*45.50*	46.00	47.00	42.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$35.00*	$34.33*	$35.67	$28.25
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$13.25	$13.25	$13.00	$14.38
Foundry coke, prompt	16.25	16.25	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	36.00	36.00	36.00	30.00
Copper, Lake, Conn.	36.00	36.00	36.00	30.00
Tin, Straits, New York	91.375	91.375*	91.375	94.00
Zinc, East St. Louis	12.00	12.00	12.00	10.25
Lead, St. Louis	14.80	14.80	14.80	13.80
Aluminum, virgin ingot	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	65.08
Magnesium, ingot	29.25	29.25	29.25	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Corrected.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birdsboro, Pa. *B6*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *U4*	52.38	52.88	56.50	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *I11*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	57.50	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.00	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
So. Chicago *R3*	56.00	.....	56.50	.....	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $66.25; Jackson, *J1, G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

←To identify producers, see Key on P. 155→

Product	301	302	303	304	316	321	347 Cb	410	416	430
Ingots, rerolling	16.75	17.75	19.25	19.00	29.75	23.50	25.50	14.00	—	14.25
Slabs, billets, rerolling	21.00	23.25	25.25	24.50	38.00	30.25	46.75	18.25	—	18.5
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	46.25	—	31.00	31.75	41.7
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.5
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.2
Plates	37.75	38.00	40.25	40.50	60.50	46.50	69.25	30.00	30.50	30.5
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.7
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.0
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50-64.75	51.25-51.50	77.50	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa. *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U1*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*, Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A5*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

Market Begins to Tighten

Prices hold firm in quiet Chicago and Pittsburgh markets . . . Dealers tighten offerings, looking for upswing . . . Major price losses confined to East.

◆ PRICES showed signs of leveling off this week although No. 1 heavy melting was off $1 in the East.

Pittsburgh and Chicago reported prices holding. Significant development in both these centers is the growing reluctance of dealers to part with scrap at going prices. Feeling is based on the expectation of a market upswing.

The price drop in Philadelphia indicates the scrap market is still shaky but this area was behind other centers in the decline and may now be completing a downward adjustment that has run its course elsewhere.

In Congress Sen. Olin D. Johnston, D., S. C., continues to press for a probe of scrap exports, which he says may be getting into Communist hands. According to Sen. Johnston, the increase in scrap exports has been greater than production increases of friendly countries would warrant. New York scrap people received the announcement calmly, saying the charges had been refuted already by an explanation of export rules and by an analysis of scrap needs in West Europe.

As a result of the drop in Philadelphia, THE IRON AGE Heavy Melting Steel Scrap Composite was off another 33¢, dropping to $34.00.

Pittsburgh . . . There has been very little activity in the scrap market the past week. Brokers are hustling for business and dealers are becoming increasingly reluctant to deal at current prices. A large consumer has notified brokers that all unfilled orders from the next to last purchase, at prices $1 above current, will be cancelled after May 31. Blast furnace grades are at a standstill.

Chicago . . . As reported last week a growing segment of the industry feels that the Chicago market is leveling and has ended its slide. While a week ago the feeling was there, this week some traders were holding back on orders with the feeling that though scrap is currently available at $33 and dealer sales of No. 1 grades have gone as low as $31, any tonnage mill buy would see prices rebound rapidly. This applies to most steelmaking grades with the exception of No. 2 dealer bundles and turnings. Though certainly not establishing a market price, turnings have moved at over established consumer delivered prices on several distress purchases of small quantities of at least one turnings grade. Mill activity continues very slow and broker buying has declined again, but the general market tone seems considerably stronger than last week.

Philadelphia . . . On the basis of the latest purchase by a large consumer, price of No. 1 heavy melting is down $1 to $35.50 tops. No. 2 heavy melting is reported softer on the bottomside by 50¢, effecting a $1.50 spread in the price of this grade. Blast furnace and low phos grades are holding firm. Railroad specialties are off $1. No. 2 bundles, now $28 on the top side, are up $1 over last week's listings.

New York . . . Price of No. 1 heavy melting dropped $1 on the purchase of a major consumer. However, reports of new market strength continue to come in and a clearer picture of the area's condition is expected to emerge in the next 2 weeks when June orders are placed.

Detroit . . . Some dealers are expressing uncertainty about the June automotive lists which start closing this week, but the general undertone of the market is soft. Meanwhile, some small supplementary tonnages have been sold to one mill but at no change in price.

Cleveland . . . A large consumer confirmed existing prices of secondary open hearth material in the Valley with a substantial purchase of No. 2 steel and No. 2 bundles. Prices paid were $26 and $31, respectively, delivered. Apart from this, there has been no activity either in Youngstown or Cleveland markets. Plenty of rumors circulating as to the intentions of other consumers, but nothing to hang your hat on.

Birmingham . . . The scrap market continues extremely dull with little prospect of improvement before the end of the month. Delivery of cars by Louisville and Nashville Railroad Co. since the end of the strike has given steel mills and foundries a fair inventory and, with vacations near in many plants, consumers seem reluctant to build inventories higher. Electric furnace scrap, however, is in some demand due to a shortage of No. 1 heavy melting, which is being bought heavily for export.

St. Louis . . . The St. Louis market has finally reacted to weakness of scrap in other markets by reducing many items $1 per ton. This was not as much as elsewhere, since the previous advances here were only by that amount. New prices will be effective on commitments by the mills for June shipment. Railroad offerings of between 50 and 60 carloads of RR No. 1 heavy melting brought $1 per ton less.

Cincinnati . . . No. 2 heavy melting price is off $1 per ton on the basis of broker offerings. Local market reflects same general conditions that have dropped prices in other areas of the country.

Buffalo . . . Prices of openhearth and electric furnace grades were off $1 as the Buffalo market continues weak. Scrap inventories in consumer yards continue to slow selling.

Boston . . . Prices were unchanged in a Boston market that remains quiet on both domestic and export fronts.

West Coast . . . Mills in Seattle, San Francisco, and Los Angeles say scrap is plentiful. Prices are steady. Mills are keeping inventories up in the face of strong export activity.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING

Isaac Pennock

Early 19th century rolling and slitting mill . . .
this is the seventh in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1793 Iron Slitting

He was a farmer destined to be the founder of one of the largest plate mills in the world.

It started with a need for slit iron rods for general blacksmith use. To meet the need, Isaac Pennock, a Pennsylvania farmer, bought a tract of land and with farm labor built an iron slitting mill.

In 1810, he acquired another mill property. It was here that the first boiler plates in America were produced. They were about 34 inches wide. However, as steel replaced iron and boilers and pressure vessels came into use, wider and thicker plates were made. Today, modern skill in welding, flame cutting, forming and flanging, together with plates of special quality are producing a more versatile product to meet industry's tremendous needs.

To help our great engineering skills continue their research to find better ways to produce these better products, we at Luria Brothers keep pace with their requirements in iron and steel scrap. If your firm has a special problem in iron or steel scrap, we'll be glad to help.

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MODENA, PENNA. — PITTSBURGH, PENNA.
ERIE, PENNA.

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DETROIT, MICH.		MONTREAL, CANADA

EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Scrap Prices *(Effective May 24, 1955)*

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	20.50 to 21.50
Mixed bor. and ms. turns.	20.50 to 21.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. punch'gs, plate	38.00 to 39.00
Heavy turnings	32.00 to 33.00
No. 1 RR. hvy. melting	36.50 to 37.50
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	42.50 to 43.50
RR. spring steel	42.50 to 43.50
RR. couplers and knuckles	42.50 to 43.50
No. 1 machinery cast.	43.00 to 44.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 factory bundles	34.00 to 35.00
No. 1 dealers' bundles	32.00 to 33.00
No. 2 dealers' bundles	23.00 to 24.00
Machine shop turn.	15.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	39.00 to 40.00
Low phos. punch'gs, plate	36.00 to 37.00
Low phos. 3 ft and under	35.00 to 36.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	52.00 to 53.00
Rails 3 ft and under	48.00 to 49.00
Locomotive tires, cut	36.00 to 37.00
Cut boilers & side frames	38.00 to 39.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	42.00 to 43.00
RR. couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	32.00 to 33.00
Cast iron brake shoes	33.00 to 34.00
Cast iron car wheels	37.00 to 38.00
Malleable	45.00 to 46.00
Stove plate	34.00 to 35.00

Philadelphia Area

No. 1 hvy. melting	$34.50 to $35.50
No. 2 hvy. melting	31.00 to 32.50
No. 1 bundles	34.50 to 35.50
No. 2 bundles	26.00 to 28.00
Machine shop turn.	20.50 to 21.50
Mixed bor. short turn.	20.50 to 21.50
Cast iron borings	20.50 to 21.50
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	28.00 to 29.00
Low phos. 5 ft and under	39.00 to 40.00
Low phos. 2 ft and under	40.00 to 41.00
Low phos. punch'gs	40.00 to 41.00
Elec. furnace bundles	38.50 to 39.50
Heavy turnings	34.00 to 35.00
RR. steel wheels	40.00 to 41.00
RR. spring steel	40.00 to 41.00
Rails 18 in. and under	50.00 to 51.00
Cupola cast.	36.00 to 38.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	44.00 to 45.00
Malleable	44.00 to 45.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	44.00 to 45.00
Charging box cast.	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$31.50 to $32.50
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	31.50 to 32.50
No. 2 bundles	23.00 to 24.00
No. 1 busheling	31.50 to 32.50
Machine shop turn.	17.50 to 18.50
Mixed bor. and turn.	22.50 to 23.50
Shoveling turnings	22.50 to 23.50
Cast iron borings	22.50 to 23.50
Cut struct'r'l & plates, 2 ft & under	39.00 to 40.00
Drop forge flashings	31.50 to 32.50
Low phos. punch'gs, plate	32.50 to 33.50
Foundry steel, 2 ft & under	38.00 to 39.00
No. 1 RR. heavy melting	35.00 to 36.00
Rails 2 ft and under	48.00 to 49.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	26.00 to 27.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	44.00 to 45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	43.00 to 44.00
Malleable	44.00 to 45.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. plate	35.00 to 36.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	29.00 to 30.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Low phos. plate	32.00 to 33.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	40.00 to 41.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles, openhearth	26.50 to 27.50
No. 2 bundles	18.00 to 19.00
New busheling	26.50 to 27.50
Drop forge flashings	26.50 to 27.50
Machine shop turn.	13.00 to 13.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	15.50 to 16.50
Low phos. punch'gs, plate	27.50 to 28.50
No. 1 cupola cast.	35.00 to 37.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	31.00 to 32.00
Automotive cast.	40.00 to 41.00

St. Louis

No. 1 hvy. melting	.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	15.50 to 16.50
Cast iron borings	17.50 to 18.50
Shoveling turnings	17.50 to 18.50
No. 1 RR. hvy. melting	35.00 to 36.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	47.00 to 48.00
Locomotive, tires uncut	36.50 to 37.50
Angles and splice bars	36.50 to 37.50
Std. steel car axles	36.00 to 37.00
RR. spring steel	37.00 to 38.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	34.00 to 35.00
Cast iron brake shoes	32.00 to 33.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Malleable	35.00 to 36.00
Unstripped motor blocks	33.50 to 34.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	26.00 to 27.00
Elec. furnace, 2 ft & under	31.00 to 32.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and short turn.	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Clean cast chem. borings	15.00 to 16.00
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.50
No. 2 hvy. melting	27.00
No. 3 bundles	$22.00 to 23.00
Machine shop turn.	10.50 to 11.50
Mixed bor. and turn.	11.50 to 12.50
Shoveling turnings	13.50 to 14.50
Clean cast chem. borings	20.00 to 21.00
No. 1 machinery cast.	37.00 to 39.00
Mixed yard cast.	31.00 to 32.00
Charging box cast.	31.00 to 32.00
Heavy breakable cast.	31.00 to 32.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	19.00 to 20.00
Electric furnace bundles	32.00 to 33.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft	36.00 to 37.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	42.00 to 43.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	43.00 to 44.00
Rerolling rails	43.00 to 44.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.50 to 36.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.50 to $32.50
No. 2 hvy. melting	27.50 to 28.50
No. 1 bundles	31.50 to 32.50
No. 2 bundles	22.50 to 23.50
Machine shop turn.	16.50 to 17.50
Mixed bor. and turn.	17.50 to 18.50
Shoveling turnings	19.50 to 20.50
Cast iron borings	17.50 to 18.50
Low phos., 18 in. & under	37.00 to 38.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	40.00 to 41.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	29.00
No. 2 bundles	25.00
No. 3 bundles	21.00
Machine shop turn.	10.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	40.00

Los Angeles

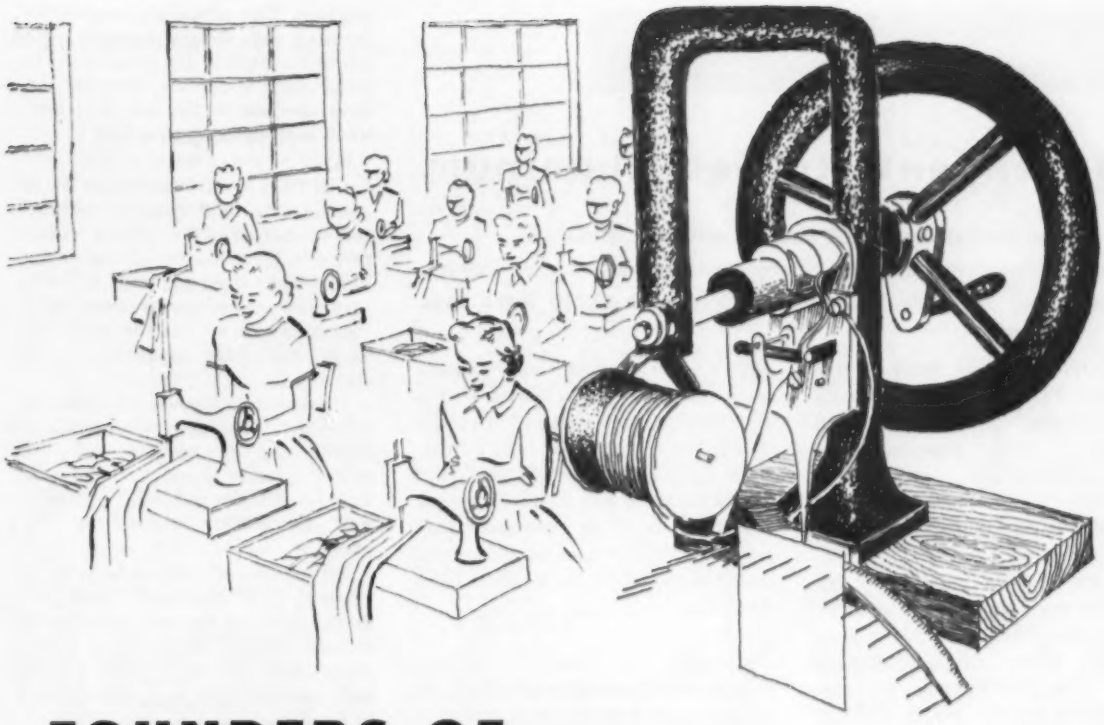
No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	29.00
No. 2 bundles	23.00
No. 3 bundles	20.00
Machine shop turn.	8.00
Shoveling turnings	10.00
Cast iron borings	10.00
Elec. furn. 1 ft. and under	30.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	$41.00 to 42.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Bushelings	29.00
Bush., new fact prep'd	32.00
Bush., new fact unprep'd	28.00
Machine shop turn	16.00
Short steel turnings	21.00
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	43.00
Cast scrap	42.00 to 45.00



FOUNDERS OF THE NEEDLE TRADES

Machine sewing became a reality when, in 1755, a double-pointed needle with the eye in the center was invented by Charles D. Weisenthal, of London; in 1830, when Barthelemy Thimmonier, a tailor of St. Etienne, invented a sewing machine; in 1846, when Elias Howe was given a patent on his model, the first practical machine to be successfully put upon the market.

Today's descendants of these inventions, millions of whirring machines, share with countless other civilian and military needs in creating a never-satisfied demand for iron and steel. To maintain a constant supply of these metals, an adequate tonnage of scrap must be made available.

For the purchase or sale of iron or steel scrap . . .

phone or write "Your Chicago Broker"

M. S. KAPLAN COMPANY

231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Independents to Get Aluminum

Alcoa agrees to deliver 27,500 tons of stockpile diverted aluminum to nonintegrated fabricators and extruders . . . Government checking Reynolds, Kaiser for delivery of 47,000 more tons.

◆ ALCOA early this week agreed to deliver 27,500 tons of aluminum to nonintegrated fabricators and extruders. This aluminum is Alcoa's share of the 74,500 tons of aluminum the government decided to divert from the stockpile a few weeks back.

The government planned to ask Reynolds and Kaiser for similar agreements. This would mean that Reynolds would supply independents with 20,500 tons of aluminum and Kaiser would add another 26,500 tons — metal that these producers were originally scheduled to deliver to stockpile during the first half of the year.

Should officials fail in their effort to get an agreement from one or both of these two producers, it was rumored the government would buy the aluminum and then resell it to independents in an effort to ease the aluminum shortage. However it works out, it seemed certain the independents would end up receiving 74,500 tons of stockpile diverted metal.

Late last week, the Aluminum Extruders Council put in request for further diversion of stockpile-scheduled aluminum. The extruders presented recommendations that 25,000 additional tons be released right away, and that another 100,000 tons be made available during the last half of 1955.

Increased supply of aluminum that will be available from Canada was outlined by Nathanael Davis, president, Aluminium Ltd., in testimony before a House Small Business Committee. Mr. Davis said Alcan plans to sell 225,700 tons of aluminum to U. S. consumers this year and 290,000 tons in 1956, compared with 1954 sales totaling 195,000 tons.

NICKEL . . . Office of Defense Mobilization has confirmed release of an additional 2 million lb of nickel to industry from scheduled deliveries under the stockpile and Defense Production Act during June. This brings to 3 million lb the amount of nickel diverted for June.

Distribution of nickel needed for defense purposes, not yet determined, will be handled by Business & Defense Services Administration. Remainder will be sold to industry by producers "on an equitable basis." No nickel is being removed from stockpile inventories.

Officials say that if defense and atomic energy needs remain constant, about 20 pct of the additional 2 million lb will go for civilian uses.

Although government officials are acutely aware of the nickel pinch, they dismiss as "highly improbable" any return of government controls, despite fears by industry that continued shortages will curtail production of nickel-bearing steels.

Controls over nickel would be reimposed, one official says, only in the event that other material controls and some general stabilization were imposed. This official also argues that industry can, and is, doing a better job of controlling the metal than the government could do "because they have men out in the field who know what each company needs."

COPPER . . . Government is requiring more mill space be reserved for production of unalloyed copper forms to fill deliveries of copper and copper-base alloy products for military and atomic energy demands in the third quarter of this year. Set-asides for other products are decreased.

Total third quarter reserves of copper-base products will remain at 54,000 tons, the same as the total second quarter set-aside. This total includes defense and AEC orders as well as defense related or "B" products.

Percentage of mill space to be reserved for unalloyed brass mill plate, sheet, strip, and rolls is increased from 7 to 8 pct; rod, bar shapes and wire from 10 to 11 pct, and seamless tube and pipe from 5 to 6 pct.

Mill space reserved for alloyed brass mill plate, sheet, strip, and rolls is decreased from 8 to 6 pct; alloyed rod, bar, shapes and wire remain at 5 pct, and alloyed seamless tube and pipe remain at 20 pct.

Exporters of copper-base alloy scrap must file their applications to meet the supplementary shipping quota of 3000 short tons (copper content) between June 1-15.

Exports under this supplementary arrangement are confined to scrap for consumption in Western Germany. Licenses become valid on July 1.

LEAD, ZINC . . . Proof of the strong demand for lead and zinc continues to pile up. Consumption of zinc in March, latest government figures show, set a new record of 95,988 tons, up 20 pct from February, and 2 pct higher than the previous record established in March 1953.

And lead sold for shipment in April, amounted to around 6500 tons, the greatest for any month since March 1954.

MAGNESIUM . . . Latest statistics from the Magnesium Assn. show amazing stability in the rate at which the magnesium industry has been operating since early last year. Total shipments of magnesium castings in the first quarter of 1955 amounted to 3518 tons, only 9 less tons than for same period a year ago.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	May 18	May 19	May 20	May 21	May 23	May 24
Copper, electro, Conn.	36.00	36.00	36.00	36.00	36.00	36.00
Copper, Lake, delivered	36.00	36.00	36.00	36.00	36.00	36.00
Tin, Straits, New York	91.50	91.50	91.75	....	91.375	91.375*
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	14.80	14.80	12.00	14.80	14.80	14.80

Note: Quotations are going prices **Tentative*

Nonferrous Prices *(Effective May 24, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	39.1	37.1	35.9	35.5
3004	44.0	39.8	38.1	37.6
5052	46.7	41.9	40.2	39.3
2024-O, -OAL	49.4	40.8	39.3	39.4
7075-O, -OAL	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 86.7¢; 12 to 14, 39.4¢ to $1.04; 24 to 26, 42.2¢ to $1.35; 36 to 38, 49.8¢ to $1.97.

Rod, Round: Rolled, 1.064-4-5 in. 1100-F, 48.6¢ to 40.1¢; cold finished, 0.375-3.499 in., 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, ¼-11/32 in., 63.5¢ to 50.1¢; ⅝-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 45.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.3¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1¼-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.5¢ to 54.6¢; 4-6 in., 40.8¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¼ x 60-in., $2.998; x 96-in., $4.801; x 120-in., $6.002; x 144-in., $7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 59¢; 3/16 in., 60¢; ½ in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 79¢; ½ to ¾ in., 62.5¢; 1¼ to 1.749 in., 59¢; 2½ to 5 in., 54.5¢. Other alloys higher. Base up to ⅜ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 67.3¢; 0.22 to 0.23 lb, 5.9 in., 64.3¢; 0.50 to 0.59 lb, 8.6 in., 61.7¢; 1.8 to 2.59 lb, 19.5 in., 59.8¢; 4 to 6 lb, 28 in., 58¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.46; 5/16 to ⅝ in., $1.32; ½ to ⅝ in., 99¢; 1 to 2 in., 82¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 67¢; 1 to 2 in., 63¢; 3 to 4 in., 62¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $14.00-$14.50; alloy $16.50; Plate, HR, commercially pure, $11.50-$12.00; alloy, $12.50-$12.75; Wire, rolled and/or drawn, commercially pure, $10.50-$11.00; alloy, $12.50; Bar, HR or forged, commercially pure, $8.50-$8.75; alloy, $8.50-$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	75	99
Strip, CR	102	87	126
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	87	82	95
Seamless Tube	122	108	153
Shot, Blocks	...	85	...

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	52.79	....	54.56
Copper, h-r	54.76	$1.11	....
Copper, drawn	....	52.36	....
Low brass	49.75	49.69	....
Yellow brass	46.27	46.21	....
Red brass	50.99	50.93	....
Naval brass	....	44.30	45.56
Leaded brass	....	....	43.09
Com. bronze	52.78	52.72	....
Mang. bronze	53.73	47.83	49.39
Phos. bronze	73.03	73.63	....
Munts metal	48.14	43.95	45.20
Ni silver, 10 pct	60.20	63.28	66.34

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.
Strip $1.74
Rod, bar, wire 1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 23.20
Aluminum pig 21.50
Antimony, American, Laredo, Tex. 28.50
Beryllium copper, per lb cont'd Be $40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $72.25
Bismuth, ton lots $2.25
Cadmium, del'd $1.70
Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
Copper, electro, Conn. Valley 36.00
Copper, Lake, delivered 36.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.8%, dollars per troy oz. $2.25
Iridium, dollars per troy oz. ..... $90 to $100
Lead, St. Louis 11.80
Lead, New York 15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig 28.50
ingot 29.25
Magnesium, sticks, 100 to 500 lb 49.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $301 to $303
Nickel electro, f.o.b. N. Y. warehouse 35.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. ..... $18 to $20
Platinum, dollars per troy oz. $76 to $79
Silver, New York, cents per troy oz. 90.16
Tin, New York 91.375
Titanium, sponge, grade A-1 ..... $3.95
Zinc, East St. Louis 12.00
Zinc, New York 12.50
Zirconium, sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 35.50
No. 120 ..... 35.00
No. 123 ..... 34.50
80-10-10 ingot
No. 305 ..... 39.00
No. 315 ..... 37.25
88-10-2 ingot
No. 210 ..... 48.75
No. 215 ..... 45.25
No. 245 ..... 40.75
Yellow ingot
No. 405 ..... 30.75
Manganese bronze
No. 421 ..... 33.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper, max. 27.75-28.25
0.60 copper, max. 27.50-28.00
Piston alloys (No. 122 type) 26.00-27.00
No. 12 alum. (No. 2 grade) 25.50-26.00
108 alloy 26.00-26.50
195 alloy 27.00-28.00
13 alloy (0.60 copper max.) 27.50-28.00
A8X-679 ..... 26.00-26.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½% 26.00-27.00
Grade 2—92-95% 25.00-26.00
Grade 3—90-92% 24.50-25.00
Grade 4—85-90% 23.50-24.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper
Cast, oval, 15 in. or longer 44.92
Electrodeposited 39.78
Flat rolled 45.42
Brass, 80-20
Cast, oval, 15 in. or longer 43.515
Zinc, flat cast 20.25
Ball, anodes 18.50
Nickel, 99 pct plus
Cast 90.50*
Cadmium $1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn. 94½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum 63.00
Copper sulphate, 99.5 crystals, bbl. 12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed 31.25*
Nickel chloride, 300 to 400 lb. 43.50*
Silver cyanide, 100 oz. lots, per oz. 75½
Sodium cyanide, 96 pct domestic 200 lb drums 19.25
Zinc cyanide, 100 lb drum 54.30
*Effective Jan. 3.

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	32	31¼
Yellow brass	23⅞	22
Red brass	28½	27⅝
Comm. bronze	29½	28½
Mang. bronze	22 1/6	21⅝
Yellow brass rod ends	23⅝	22

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 34
No. 2 copper wire 32½
Light copper 30¾
*Refinery brass 30
* Dry copper content

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 33½
No. 2 copper wire 32
Light copper 30¼
No. 1 composition 27
No. 1 comp. turnings 26½
Rolled brass 20½
Brass pipe 19½
Radiators 21
Aluminum
Mixed old cast ..... 14½—15
Mixed new clips ..... 16½—17
Mixed turnings, dry ..... 15½—16

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire 31½—32
No. 2 heavy copper and wire 30 —30½
Light copper 28 —28½
New type shell cuttings 28 —28½
Auto radiators (unsweated) 18 —18½
No. 1 composition 24½—25
No. 1 composition turnings 24 —24½
Unlined red car boxes 18½—19
Cocks and faucets 19½—20
Mixed heavy yellow brass 16½—17
Old rolled brass 18 —18½
Brass pipe 19½—20
New soft brass clippings 21½—22
Brass rod ends 20½—21
No. 1 brass rod turnings 19½—20

Aluminum

Alum. pistons and struts 12 —13
Aluminum crankcases 13 —13½
1100 (2S) aluminum clippings 15 —16
Old sheet and utensils 13 —13½
Borings and turnings 7½— 8
Misc. cast aluminum 11 —11½
2024 (24s) clippings 13 —13½

Zinc

New zinc clippings 6½— 7
Old zinc 4¾— 5
Zinc routings 3¼— 3½
Old die cast scrap 3¼— 3½

Nickel and Monel

Pure nickel clippings 57
Clean nickel turnings 40
Nickel anodes 57
Nickel rod ends 57
New Monel clippings 28
Clean Monel turnings 21
Old sheet Monel 26
Nickel silver clippings, mixed 15½
Nickel silver turnings, mixed 13½

Lead

Soft scrap lead 11½—11⅝
Battery plates (dry) 6½— 6¾
Batteries, acid free 4½

Magnesium

Segregated solids 18½—19
Castings 17½—18

Miscellaneous

Block tin 75 —77
No. 1 pewter 58 —59
No. 1 auto babbitt 37 —38
Mixed common babbitt 14
Solder joints 17 —17½
Siphon tops 40
Small foundry type 15½—16
Monotype 14½—15
Lino. and stereotype 14 —14¼
Electrotype 12 —12¼
Hand picked type shells 10¾
Lino. and stereo. dross 4½— 5
Electro dross 3½— 4

IRON AGE

STEEL PRICES

(Effective May 24, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B3*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *R7,S10*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													12.45 *C11*
	Harrison, N. J.													
	Conshohocken, Pa.								4.10 *A2*	5.80 *A2*	6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Boston, Mass.									6.30 *T8*				12.80 *T8*
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					4.20 *P2*		4.30 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3*	6.15 *B3*	8.425 *B3*		
	Bridgeport, Wallingford, Conn.	$69.00 *N8*	$83.00 *N8*						4.35 *N8*	6.20 *W1*			7.00 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.30 *N7* 6.60 *A5*				12.75 *A5* 12.80 *N7*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$80.00 *R3*	$86.00 *R3, T5*										12.45 *G4*
	Chicago, Ill.	$64.00 *U1*	$78.00 *R3, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1,N4, W8*	5.85 *A1,T8*				12.45 *T8*
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.45 *A5*
	Detroit, Mich.			$86.00 *R5*					4.15 *G3,M2*	5.85 *D1,D2, G3,M2,P11*	6.25 *G3*	8.70 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	5.85 *I3*	6.15 *U1, I3,Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C5*				
	Newport, Ky.												6.70 *Y5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R3, T4*	6.15 *S1, R3*	8.60 *S1, R3*	6.70 *S1*	12.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *P6*	5.75 *B4,J3, S2*			6.70 *S9*	12.45 *S9*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3,W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1,C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C5*
WEST	Fontana, Cal.	$72.00 *K1*	$86.00 *K1*	$105.00 *K1*		4.00 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.50 *K1*	7.25 *K1*		8.10 *K1*	14.55 *K1*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$106.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.00 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	Portland, Ore.					5.00 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$87.50 *B2*			4.00 *B2* 4.95 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.00 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *C16, R3,T2*	6.40 *T2*		4.05 *R3, T2,C16*		6.15 *T2*			
	Houston, Lone Star, Tex.	$70.00 *L3*	$83.00 *S2*	$91.00 *S2*		4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	

IRON AGE

STEEL PRICES

(Effective May 24, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS										WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.			Coke* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.														
	Buffalo, N. Y.	4.05 *B3*	4.95 *B3*				6.10 *B3*	7.50 *B3*				4.675 *W6*	† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.		
	Claymont, Del.														
	Coatesville, Pa.														
	Conshohocken, Pa.	4.10 *A2*	5.00 *A2*				6.15 *A2*								
	Harrisburg, Pa.														
	Hartford, Conn.														
	Johnstown, Pa.											4.675 *B3*			
	Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*					$8.00 *U1*	$7.60 *U1*	
	New Haven, Conn.														
	Phoenixville, Pa.														
	Sparrows Pt., Md.	4.05 *B3*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*			4.775 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.											4.975 *A5*			
	Trenton, N. J.														
MIDDLE WEST	Alton, Ill.											4.85 *L1*			
	Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*										
	Canton-Massillon, Dover, Ohio			5.45 *R1, R3*						5.175 *R1*					
	Chicago, Joliet, Ill.	4.05 *A1, W8*					6.10 *U1*					4.675 *A5, N4, R3*			
	Sterling, Ill.											4.775 *N4*			
	Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*				4.675 *A5*			
	Detroit, Mich.	4.15 *G3, M2*	5.05 *G3*				6.20 *G3*	7.60 *G3*							
	Newport, Ky.	4.05 *N5*	4.95 *N5*	5.45 *N5*											
	Gary, Ind. Harbor, Indiana	4.05 *I3, U1, Y1*	4.95 *I3, U1, Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1, I3, Y1*	7.50 *U1, Y1*				4.675 *Y1*	$8.80 *I3, U1, Y1*	$7.50 *I3, U1, Y1*	6.20 *U1, Y1*
	Granite City, Ill.	4.25 *G2*	5.15 *G2*	5.65 *G2*	5.575 *G2*									$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*		4.775 *C9*			
	Mansfield, Ohio					5.85 *E2*				5.175 *E2*					
	Middletown, Ohio		4.95 *A7*		5.375 *A7*	5.85 *A7*									
	Niles, Warren, Ohio Sharon, Pa.	4.05 *S1, R3* 5.30 *N3*	4.95 *R3* 5.975 *N3*	5.45 *N3, R3*	6.725 *N3*	5.85 *N3*	6.10 *S1, R3*	7.50 *R3*					$8.80 *R3*	$7.50 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 *J3, U1, P6*	4.95 *J3, U1, P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*			4.675 *A5* 4.875 *P6*	$8.80 *J3, U1*	$7.50 *J3, U1*	6.20 *U1*
	Portsmouth, Ohio	4.05 *P7*	4.95 *P7*									4.675 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5, F3*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*					$8.80 *W3, W5*	$7.50 *W3, W5*	6.20 *F3, W5*
	Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*				4.675 *Y1*			
WEST	Fontana, Cal.	4.825 *K1*	6.05 *K1*				6.875 *K1*	8.55 *K1*				5.475 *K1*			
	Geneva, Utah	4.15 *C7*													
	Kansas City, Mo.											4.925 *S2*			
	Los Angeles, Torrance, Cal.											5.475 *C7, B2*			
	Minnequa, Colo.											4.925 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*								5.325 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash.														
SOUTH	Atlanta, Ga.														
	Fairfield, Ala. Alabama City, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.35 *R3*		4.675 *T2, R3*	$8.90 *T2*	$7.60 *T2*	
	Houston, Tex.											4.925 *S2*			

IRON AGE

STEEL PRICES

(Effective May 24, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3,R3*	4.30 *B3,R3*	5.45 *B5*	5.075 *B3,R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3,R3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Coatesville, Pa.							4.225 *L4*		5.80 *L4*	6.45 *L4*	
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							4.225 *C3*	5.275 *C3*			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.85 *W10*		6.80 *W10*						
	Camden, N. J.			5.85 *P10*								
	Bridgeport, Putnam, Conn.	4.55 *N8*		5.95 *W10*	5.225 *N8*			4.475 *N8*				
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.85 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85 *W11* 5.95 *B5,C14*		6.925 *A5,B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7,N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.40 *R3*		5.40 *R2,R3*	5.075 *R3,T5*	6.625 *R2,R3, T5*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8,R3, P15*	4.30 *N4,R3, P15*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1,R3, W8*	6.625 *A5,W8, W10,L2,B5*		4.225 *U1,W8, I3,A1,R3*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N6,W7*
	Cleveland, Ohio	4.30 *R3*	4.30 *R3*	5.40 *A5,C13*		6.625 *A5,C13*	6.45 *R3*	4.225 *J3,R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.40 *G3* 4.45 *R5*		5.40 *R5* 5.60 *B5,P8* 5.65 *P3*	5.075 *R5* 5.175 *G3*	6.625 *R5* 6.825 *B5,P3 P8*	6.55 *G3*	4.325 *G3*			6.55 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5,R3,*	5.075 *I3, U1, Y1*	6.625 *M5, R3*	6.45 *U1,I3, Y1*	4.225 *I3, U1,Y1*	5.275 *I3*	5.80 *U1,Y1*	6.45 *U1,I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.40 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.30 *R3*					6.45 *R3*	4.225 *S1,R3*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *J3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8, C11,J3 W10,B4,R3*	5.075 *U1,C11*	6.625 *A5,C11, W10,C8,R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1, Y1, C10,R3*	4.30 *U1, Y1, R3*	5.40 *F2,Y1, C10*	5.075 *U1, Y1, C10*	6.625 *Y1,C10* 6.665 *F2*	6.45 *U1, Y1*	4.225 *U1, Y1, R1*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*					6.00 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.85 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				6.00 *C6*
	Portland, Ore.	5.05 *O2*	5.05 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2,P12, N6*	5.05 *B2,P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16, R3*	4.30 *T2,C16, R3*				6.45 *T2*	4.225 *T2,R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*	4.55 *L3* 4.275 *S2*		5.85 *S2*	6.50 *S2*	6.00 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal	Blk.	Gal	Blk.	Gal	Blk.	Gal	Blk.	Gal	Blk.	Gal	Blk.	Gal	Blk.	Gal	Blk.	Gal	Blk.	Gal	Blk.	Gal
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.75	+4.5	13.75	+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton, Ill. *L1*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling *W5*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	14.25		18.25		20.25		20.75		21.25		21.75		22.25		.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	24.5	10.75
Alton, Ill. *L1*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.25	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	24.5	10.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	24.5	10.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	24.5	10.75

Threads only, buttweld and seamless 2¼ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt higher discount. Buttweld jobbers discount, 5 pct.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.00¢ per lb.

Steel Prices

(Effective May 24, 1955)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.45	5.35	5.425				
So. Chicago *R3*				7.30			
Ensley *T2*	4.45	5.35					
Fairfield *T2*		5.35		7.30		5.275	
Gary *U1*	4.45	5.35				5.275	
Ind. Harbor *I3*	4.45		5.425	7.30		5.275	
Johnstown *B3*		5.35					
Joliet *U1*		5.35	5.425				
Kansas City *S2*				7.30			11.50
Lackawanna *B3*	4.45	5.35	5.425			5.275	
Minnequa *C6*	4.45	5.85	5.425	7.30		5.275	11.50
Pittsburgh *O1*					11.00		11.50
Pittsburgh *P5*					11.00		11.50
Pittsburgh *J3*				7.30			
Seattle *B2*				7.00		5.425	12.00
Steelton *B3*	4.45		5.425			5.275	
Struthers *Y1*				7.30			
Torrance *C7*						5.425	
Williamsport *S5*		5.35					
Youngstown *R3*				7.30			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.825	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
		Grain Oriented	
Trans. 65	12.50		
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*$33.60	
Washington, Pa., *J2*		
Claymont, Del., *C4*		
New Castle, Ind., *I2*		29.75
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	39.50	
Inconel-carbon		
10 pct. Coatesville, Pa., *L4*	47.90	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	40.80	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire* Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	137	146	...	155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149	...		156	6.90	7.45
Atlanta *A8*	139	151	...	157	164	7.00	7.525
Bartonville *K2*	139	151	...	157	164	7.00	7.55
Buffalo *W6*						6.90	7.20
Chicago, Ill. *N4*	137	150	...	155	163	6.90	7.475
Cleveland *A6*	142						
Cleveland *A5*						6.90	
Crawfordsville *M4*	139	151	...	157	159	7.00	7.55
Donora, Pa. *A5*	137	149	...	155	162	6.90	7.45
Duluth *A5*	137	149	150	155	162	6.90	7.45
Fairfield, Ala. *T2*	137	149	...	155	162	6.90	7.45
Galveston *D4*	139						
Houston *S2*	142	154	...		164	7.15	7.70
Johnstown, Pa. *B3*	137	149	...		162	6.90	7.45
Joliet, Ill. *A5*	137	149	...	155	162	6.90	7.45
Kokomo, Ind. *C9*	139	148	...	157	161	7.00	7.55
Los Angeles *B2*						7.85	
Kansas City *S2*	142	158	...	167	164	7.15	7.90
Minnequa *C6*	142	151	155	160	164	7.15	7.55
Monessen *P6*	137	151	...		163	6.90	7.45
Moline, Ill. *R3*			155				
Pittsburg, Cal. *C7*	156	172	...	179	182	7.85	8.40
Portsmouth *P7*						6.90	7.90
Rankin, Pa. *A5*	137	149			162	6.90	7.45
So. Chicago *R3*	137	146	150	...	159	6.90	7.30
S. San Francisco *C6*					179		
Sparrows Pt. *B3*	139	...	...	157	164	7.00	7.55
Struthers, O. *Y1*						6.90	7.55
Worcester *A5*	143	...	...	...	...	7.20	...
Williamsport, Pa. *S5*	...	...	150	...	...	...	...

Cut Nails, carloads, base $8.30 per keg at Conshohocken Pa. (*A2*). Galvanized products computed with zinc at 11.0¢ per lb. Exceptions: Alabama City and So. Chicago computed with zinc at 5¢; Chicago, zinc 12¢.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: As rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Baltimore	$.20	6.02	7.51	7.79-7.89	6.69	.....	6.37	6.72	6.68	8.02	12.94	12.54	15.34	15.19
Birmingham	.15	6.35-6.50	7.35-8.10	8.25-9.00	6.60	8.85	6.65	6.65	6.50	8.85	.....	16.00	.....	19.80
Boston	.10	7.23	8.23-8.78	9.57	7.47	9.75	7.37	7.49	7.20	8.60	12.85-13.00	12.60	15.40	15.25
Buffalo	.25	6.30	7.40	8.84	6.65	7.02	6.60	6.67	6.45	7.40	12.70	12.15-12.30	15.10	14.95
Chicago	.20	6.28	7.38	8.30	6.62	.....	6.52	6.69	6.51	7.25	12.25	12.03	14.60	14.70
Cincinnati	.20	6.49-6.53	7.37-7.42	8.25-8.30	6.86-6.91	.....	6.81-6.86	6.86	6.75-6.80	7.55	12.55	12.30	14.90	14.95
Cleveland	.20	6.38	7.38	8.25	6.72	.....	6.69	7.02	6.57	7.35	11.96	12.11	.....	14.76
Denver		8.15	9.80-10.05	10.72	8.40	.....	8.10	8.15	8.30	9.92	.....	.....	.....	17.12
Detroit	.20	6.57	7.57	8.58	6.90	.....	6.80	7.16	6.79	7.54	12.65	12.25	15.05	14.90
Houston		7.35	7.80	9.93-9.99	7.70	.....	7.35	7.60	7.70	9.30-9.40	.....	13.25	.....	.....
Kansas City	.20	7.05	8.05	8.97	7.29	.....	7.19-7.30	7.36	7.16	8.02	13.12	12.72	15.52	15.37
Los Angeles	.10	7.50	9.35	9.05	7.85	.....	7.45	7.65	7.45-7.55	10.15*	.....	13.45	.....	16.60
Memphis	.10	6.70	7.60	.....	6.90	.....	7.01	7.00	6.85	8.65	.....	.....	.....	.....
Milwaukee	.20	6.47	7.47	8.21-8.30	6.71	.....	6.61	6.86	6.68	7.44	12.34	12.14	14.69	14.79
New Orleans	.15	6.70	7.65	9.23	6.80	.....	6.90	7.05	6.80	8.60-10.70	.....	.....	.....	.....
New York	.10	6.97-7.07	7.91-8.56	8.79-8.89	7.56-7.66	10.15	7.27-7.37	7.38-7.48	7.37-7.47	8.73-8.83	12.63	12.43	.....	15.08
Norfolk	.20	7.00	.....	.....	7.10	.....	7.10	7.19	7.10	8.60	.....	.....	.....	.....
Philadelphia	.10	6.19	7.44	8.28†	6.96	.....	6.40	6.54	6.74	7.86	12.61-12.76	12.26-12.36	15.06-15.16	14.99-15.01
Pittsburgh	.20	6.38	7.38	8.30	6.72	.....	6.52	6.69	6.51	7.35	12.45	12.05	14.85	14.70
Portland	.20	7.00-7.80	7.75	9.16	7.05-7.25	.....	6.85	7.00	7.05	10.20-11.70	.....	.....	.....	.....
Salt Lake City	.20	7.65	10.20	10.70	9.05	.....	7.70	7.70-8.65	8.80	10.95	.....	.....	.....	.....
San Francisco	.20	7.55	8.95	9.40-9.45	7.80	.....	7.40	7.50	7.35	10.05*	.....	13.35	.....	16.50
Seattle	.60	8.10	9.80	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.80	.....	16.45
St. Louis	.20	6.67	7.67	8.59	6.91	.....	6.81	7.00	6.80	7.64	12.74	12.34	15.14	14.99
St. Paul	.20	7.04	8.04	8.96	7.28	.....	7.18	7.35	7.17	8.01	.....	12.71	.....	15.36

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (*) 1500 to 9999 lb. (†) 1000 lb or over. (‡) $.25 delivery. (§) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, New Britain, Conn. *N8*	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R7*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*		8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.85	8.25	9.20	10.95	.....
Detroit *D2*	5.85	8.25	9.20	.....	.....
Harrison, N. J. *C11*	.....	.....	9.30	11.45	14.15
Indianapolis *C5*	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	.....
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	.....
Pawtucket, R. I. *N7*	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*		8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	11.15	13.85
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.00	8.35	9.30	11.45	14.15
Youngstown *C5*	5.85	8.05	9.00	11.15	13.85

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.46	32.95
	2½	12	38.15	45.74	37.00	44.36
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	.....
	2½	12	38.15	45.74	37.00	.....
	3	12	44.05	52.82	42.72	.....
	3½	11	51.43	61.66	49.88	.....
	4	10	68.29	81.88	66.24	.....
Pittsburgh Steel	2	13	28.33	33.97	.....	.....
	2½	12	38.15	45.74	.....	.....
	3	12	44.05	52.82	.....	.....
	3½	11	51.43	61.66	.....	.....
	4	10	68.29	81.88	.....	.....

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium	.73
Oil hardened manganese	.405
Special carbon	.37
Extra carbon	.31
Regular carbon	.26

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24-in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$129.50 to $131.50

Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a tone above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$13.00 to $13.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.50
Philadelphia, f.o.b.	24.00
Swedeland, Pa., f.o.b.	24.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	22.00	40	110	10.80
20	72	21.25	30	100, 110	9.50
16 to 18	72	21.50	33	110	9.50
14	72	22.00	30	110	9.60
12	72	22.25	24	72 to 84	9.85
6 to 10	60	22.75	20	90	9.85
7	60	23.00	17	72	9.85
6	60	25.50	14	72	10.25
4	40	28.50	16, 12	60	11.10
3	40	30.00	8	60	11.40
2½	30	30.75			
2	24	47.75			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	Discount C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
¾" or smaller	55	64
⅞" to 1⅛" inclusive	58	66
1¼" to 1½" inclusive	60	67½

C.P. Hex. regular & hvy

All sizes	55	64

Hot Galv Nuts (all types)

¾" or smaller	38	50
⅞" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	Discount H.C. Heat Treated
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* 5" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Discount Stove Bolts
Packaged, package list		33	43
Bulk, bulk list			
¼-in. diam. & under	15,000- 99,999	17	59
	100,000-199,999	25	63
	200,000 & over	33	67
5/16-in. diam. & larger	15,000- 49,999	17	59
	50,000- 99,999	25	63
	100,000 & over	33	67
All diam. over 3 in. long	5,000- 49,999	..	59
	50,000- 99,999	..	63
	100,000 & over	..	67

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Discount Square
Packaged, package list		30	33
Bulk, bulk list			
⅜-in. diam. & smaller	15,000- 99,999	15	17
	100,000-199,999	23	25
	200,000 & over	31	33

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick

	Per net ton
Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

Rt. ⅜-in., grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.00
in sacks	43.75

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	15.10
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; effective CaF_2 content.

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East, carloads	9.5¢ / 10.75¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, 99.5+% Fe	88.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	63.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	51.50¢
Copper, reduced	51.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	23.50¢
Manganese	87.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder, 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective May 24, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C ..	36.00	0.15% C ...	33.75
0.025% C, Simplex ..	34.50	0.20% C ...	33.50
	34.50	0.50% C ...	33.25
0.06% C ...	34.50	1.00% C ...	33.00
0.10% C ...	34.00	2.00% C ...	32.75

66-69% Cr, 4-9% C 24.75
62-66% Cr, 4-6% C, 6.9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.15
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 2.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	48.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	25.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $88.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.65	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo $1.38

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$12.00
Less ton lots	12.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta.... $6.35

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ½ x down,

packed, per pound contained W. ton lots, f.o.b. $3.80

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.37

bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.34

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20

F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	65¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots $2.05

Silcas, contract basis, delivered.

Ton lots ..... 45.00¢

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How the Steel Industry Is Fighting Air Pollution

When the public hears about dust and fume control it is often in terms of what has *not* been done. It is important that they should also know what *has* been done, because the record of the steel industry is one of the most progressive.

The purpose of this discussion is to give the executives the facts to prove this point.

Q. *First of all, how can you measure the progress of dust and fume control in the iron and steel industry?*

A. As you know, there are many ways to combat air pollution. Equipment and methods vary in effectiveness, but the industry agrees that electrical precipitators have the highest collection efficiencies. By keeping track of the demand for this high efficiency equipment over the years, we can get a good indication of the importance the industry places on dust and fume control and the progress they are making.

Q. *Do these figures show an increasing interest in this high efficiency equipment?*

A. Suppose we let the figures speak for themselves. Since 1945 precipitator capacity in the steel industry had a greater increase than in any previous ten year period. Precipitators handling about 6½ million cfm were installed during this period.

Q. *But can't you attribute this growth to the increase in steel-making capacity?*

A. Some of this growth is due to expanded production facilities, but that's just a part of it. For instance, iron and steel production has increased about 30% since 1945 — but precipitator capacity has increased about 130% during this same period.

Q. *In the old days, I guess precipitators were used primarily in blast furnaces, weren't they?*

A. That's right. The first one went into operation in 1930. Since then, 169 Research Cottrells have been ordered by the industry.

Q. *What about new applications?*

A. We have a number of new uses that have proven themselves on the job. Open hearths, for instance. In one installation, our precipitators reduced stack discharge to a little over 2 pounds per hour. That's quite a reduction when you consider that the discharge without a precipitator ranged from 75 to 245 pounds per hour.

Q. *I understand your Cottrells are used on some sintering machines now. Is this true?*

A. Yes, we have three in operation and more under construction.

Q. *How about scarfing machines?*

A. This is a recent application which has worked out very satisfactorily. Two precipitators are now in operation on this application.

Q. *Has anything been done on such problems as iron cupolas, electric furnaces, and ferromanganese blast furnaces?*

A. Yes. Installations have been made on all these problems.

Q. *How do you go about developing these new applications?*

A. We work very closely with our customers on these new projects. Our laboratory is a big help, and our 40 years of pilot plant experience plus over 2,000 precipitators give us the kind of experience that leads to the successful engineering of projects like these.

If you would like to have more information about these applications, or if you want to investigate the possibility of using precipitators on other equipment, our nearest representative will be glad to call on you.

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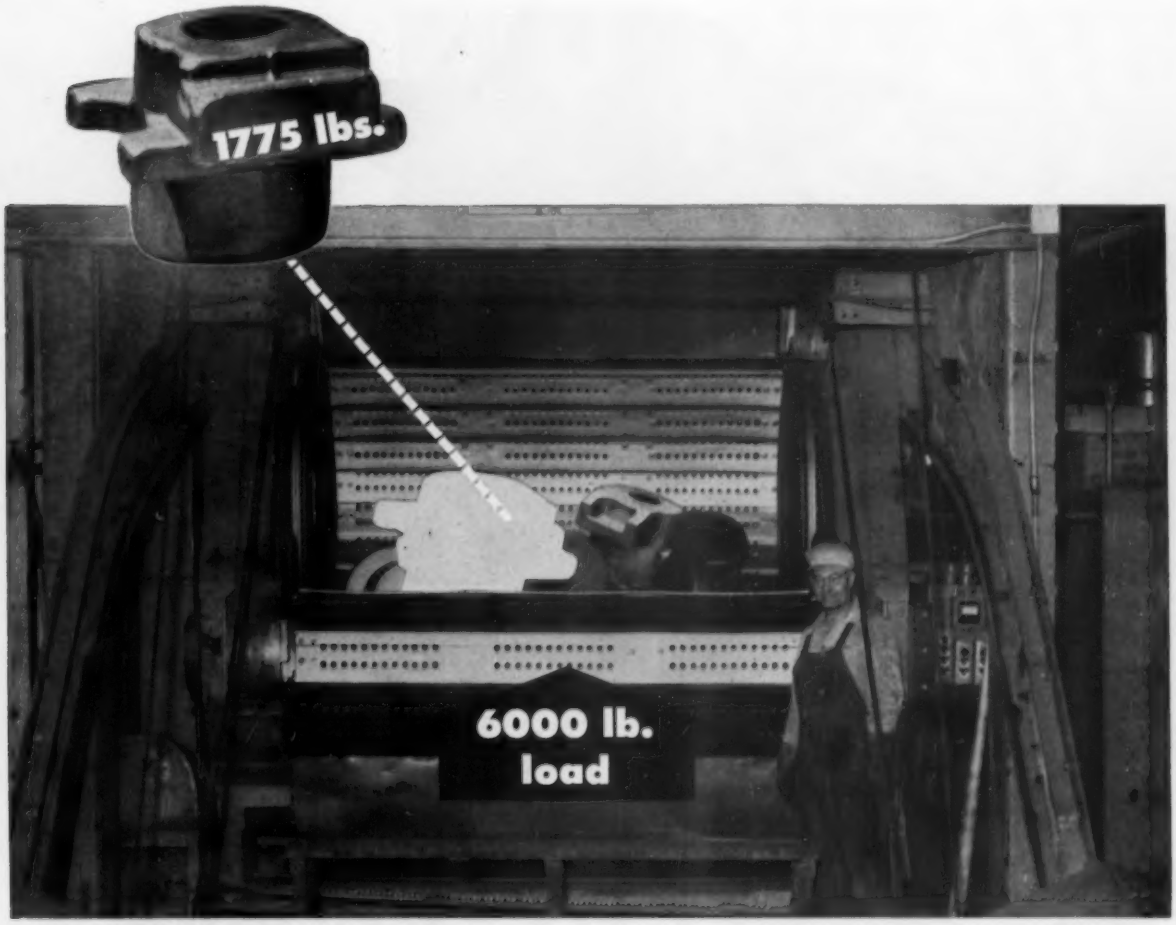

WHEELABRATOR® Cleans 6000 to 7000 lb. Loads in 15 minutes

5000 tons of forgings cleaned monthly

King size performance on king size payloads! Every 15 minutes, from 6000 to 7000 lbs. of huge steel forgings are spotlessly cleaned in each of two Wheelabrator airless abrasive blast cleaning machines at Cameron Iron Works, Houston, Texas. Included in this production are forgings weighing nearly a ton apiece — forgings in shapes and sizes far beyond anything previously available.

To clean this heavy, bulky type of work at the production rates required, only the 60″x96″ Wheelabrator Tumblast (63 cu. ft. operating load capacity) could meet all requirements. Operation and performance of the two units have far surpassed their expectations in high production speed and low overall cleaning cost.

Because most forgings are cleaned three times — first to remove a tough forging scale, again after chipping and finally after heat treating—the two Wheelabrators, along with two smaller units, handle more than 5000 tons of forgings monthly. Only one operator and a helper are required to man the four Wheelabrators — labor costs are insignificant considering the tonnages handled.

Even though your cleaning problem may not be on such a big scale, Wheelabrator airless blast cleaning can be applied with cost saving economy to your problem. Write today for Catalog 74C for complete information.

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AMERICAN WHEELABRATOR & EQUIPMENT CORP. 510 S. Byrkit St., Mishawaka, Indiana

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Here's what you GET in Panther 5 . . . A high-carbon, high-vanadium, tungsten-bearing high speed steel with 5% cobalt. Its analysis is designed to give this grade the highest red-hardness and abrasion-resistance of *any* high speed steel.

Here's how it can HELP you . . . This combination of highly valuable properties gives Panther 5 exceptional ability to resist wear, yet it also possesses good toughness and edge strength. Put Panther 5 Tool Bits on your heavy-duty jobs and abrasive materials—*watch them step up your production runs between grinds!*

Stocked in ALL SIZES . . . Panther 5 Tool Bits are produced as a finish-ground product. They're carried in stock for immediate shipment in nine sizes of squares, from ¼" x 2½" long to 1" x 7" long . . . and in eighteen sizes of flats, ranging from ⅛" x ¼" x 3" long to 1½" x ¾" x 7" long. ● *Why not get in a trial order—see for yourself what they'll do!* Check your nearest AL representative or distributor . . . or write ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

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1. **"HIGH SPEED TOOL BITS"**
   Handy data on the complete AL line, comprising eight different grades of high speed steel tool bits. Includes shop handling, heat treat methods, etc.

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   This 36-page booklet analyzes and compares all AL grades of cutting tools: carbon and high speed steel, cast alloy and carbides. Includes data on handling and treatment.

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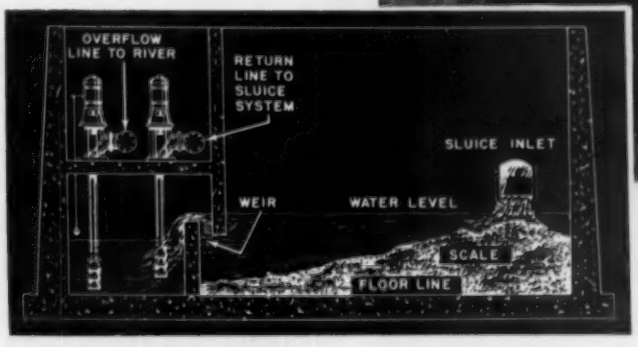
W&D-5504

AL FINE TOOL STEELS SINCE 1854

Pumping Pit with Ingersoll-Rand vertical turbine pumps, heart of mill-scale recovery system at Allenport, Pa. plant of Pittsburgh Steel Corp. Two 6000 gpm units, in foreground, recirculate settled water. Smaller 3000 gpm pumps, at top, discharge overflow into river.



In Rolling Slabs at the hot strip mill, scale is removed from hot steel by water jets. Water carries the scale into a collecting tank. From the tank, a clam-shell bucket removes it to sintering plant. Steel content is used in blast furnaces, and stream pollution is reduced by the mill-scale recovery.

In mill-scale recovery

I-R Pumps of Stainless give 30 Times the Life

CORROSIVE ACTION of a notoriously unclean river . . . polluted with acid mine drainage . . . is defeated by these Ingersoll-Rand pumps.

Erosion is minimized, too. Erosion by abrasives in recirculated water of a millscale sluicing system. And erosion by hard, tough particles in water agitated by a clamshell used for scale removal.

That's why pumps of standard materials needed extensive repairs after only two months' use.

In contrast, chromium-nickel stainless steel units operated five years without replacements or loss in efficiency and performance.

Ingersoll-Rand pump specialists, metallurgists and engineers use these money-saving nickel alloys for impellers, casings, shafting, bolting and even for small interior parts of pumps in mill-scale service.

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• These six Weldco pickling crates, made of Monel, are now in use in a Gary, Indiana, sheet mill. Sturdy and long-lasting, they're pickling sheet steel in a 5 to 10% sulphuric acid bath at 160° to 180° F. An extra feature of these Monel crates is the new, pierced-type cross member, with these cost-cutting advantages:

1. Greater strength—more tonnage per load.
2. Less hole distortion or enlargement. The taper pins remain tight—do not become loose or wobble.
3. Less time needed for loading, as less time required for placing pins, due to tapered hole.
4. Only a small surface is exposed to attack by acid. Cross member retains its strength longer, and there are fewer replacements.

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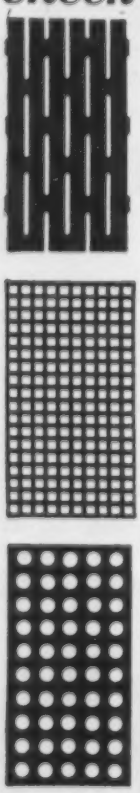

- ✓ Wide variety of dies for stainless and carbon steel, monel, copper, brass, bronze and aluminum.
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- ✓ Material to be perforated may be supplied either by us or by your company.

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USE THE KING PORTABLE
To Make Standard Brinell Tests

Puts an actual load of 3000 kg. on a 10 mm ball

The King PORTABLE BRINELL is guaranteed to make Brinell tests of the greatest accuracy on large and small parts of almost any shape. In addition, this versatile unit:

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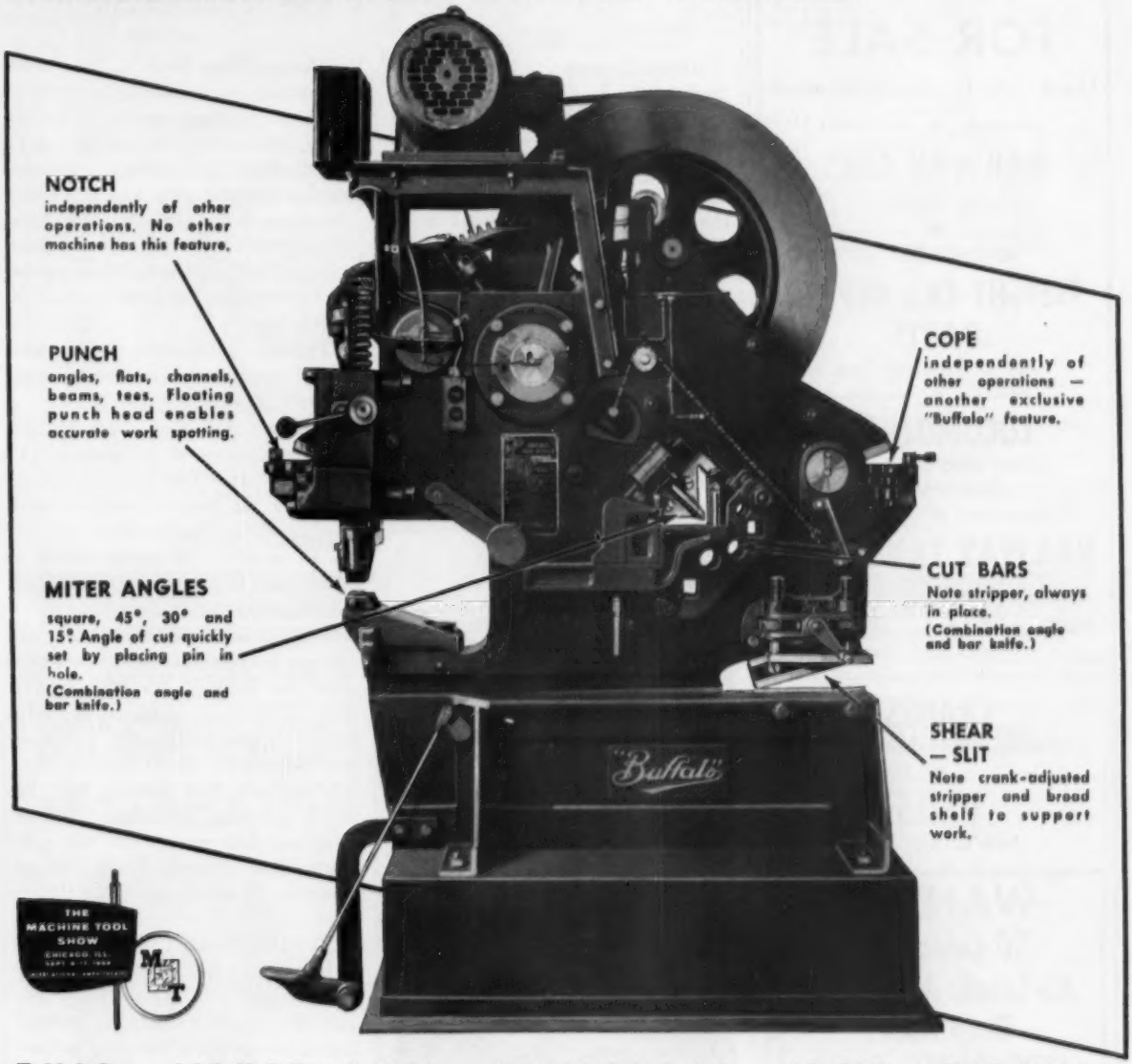
THE IRON AGE

HOW MANY FABRICATING MACHINES IN THIS PICTURE?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independently of other operations. No other machine has this feature.
PUNCH
angles, flats, channels, beams, tees. Floating punch head enables accurate work spotting.
MITER ANGLES
square, 45°, 30° and 15°. Angle of cut quickly set by placing pin in hole.
(Combination angle and bar knife.)
COPE
independently of other operations — another exclusive "Buffalo" feature.
CUT BARS
Note stripper, always in place.
(Combination angle and bar knife.)
SHEAR — SLIT
Note crank-adjusted stripper and bread shelf to support work.
"Buffalo"
THE MACHINE TOOL SHOW

THIS "BUFFALO" UNIVERSAL IRON WORKER CAN DO 5 JOBS WHILE YOU READ THIS AD!

Yes, the "Buffalo" Universal Iron Worker is a whole shop-full of fabrication tools, all in one compact, powerful machine. Think of the time and floor space this saves in a shop. "Buffalo" Universal Iron Workers are making a big difference in output and profits in hundreds of plants.

Also, the choice of models include such exclusive features as independent built-in notcher and coper—instant miter setting—extra-wide stripper bars—all features that constitute the "Q" Factor* in every "Buffalo" product. Write today for Bulletin 360 and see what this machine could be doing for you!

*The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Honor Dealer . . . Charles L. McDonald, Sr., of St. Louis has been named Outstanding Machinery Dealer of 1955 by the Machinery Dealers National Assn. Presentation of the new award came at the annual MDNA convention in Cincinnati.

Head of McDonald Machinery Co., St. Louis, Mr. McDonald carries on a family tradition that extends back to Civil War days when the iron clad *Monitor* was outfitted by his father's company. He joined his father's concern in 1887, concentrating on the used machinery end of the business and forming the present McDonald company in 1920. Today McDonald warehouses and showrooms occupy more than 34,500 sq ft of floor space.

Mr. McDonald has held high MDNA posts. He helped create the organization and has a long record of activity aimed at establishing "high ethical standards among dealers." He is a vigorous church and civic worker, and still puts in a full business day. He represents one of three generations of McDonalds active in the company today.

OUTSTANDING: Charles L. McDonald has just been named Outstanding Machinery Dealer of 1955.

Detroit Does Well . . . The used machinery business in the Detroit area is holding steady although some dealers report they are having their ups and downs. Business varies between good and bad from one week to the other but the overall picture shows that it is holding up. A slight pickup in older pieces of equipment started about 3 weeks ago.

Prices, particularly for late model used machines, are holding up and expected to stay firm.

Demand for tool room equipment continues to be very brisk. Delivery time for new machines such as jig borers, vertical and boring mills is anywhere from 15 to 18 months. In cases where a shop can't wait for a new machine used equipment is bought.

One dealer reported that although his business was slow right now, the demand for both tryout and production presses is very high. He blamed the slow business on two things. Small manufacturers, he said, are waiting for the UAW contract settlement before they buy any machinery. He predicted that business would pick up once the issue was settled.

Tax Deal Hurts . . . Tax amortization rates are another reason that some types of machinery are not moving. For example, a small tool and die shop can buy a new machine for $500 down and pay the balance in 3 years. In addition, tax laws allow cost to be written off in a shorter time than for used machines.

Buying on the most part is for replacing equipment. The larger shops are buying larger presses and the smaller companies are either replacing worn out equipment or rebuilding what they have in their shops.

Welding equipment, planers, heavy lathes and grinders are slow items right now but dealers are optimistic about the future.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSOR
2295 cu. ft. Ingersoll Rand PRE-2 26½"x15"x19" 150# Pressure. Complete with Elecl. Equip., Air Receiver, etc. NEW 1953

ANGLE BENDING ROLL
4' x 4 x ½" Bertsch Angle Bending Roll, M.D.

BENDING ROLLS
8' x ¼" Bertsch Initial Type
8' x ⅜" Webb 9L-2 Initial Type
12' x ½" Hilles & Jones Pyramid Type
14' x 1" Williams & White Pyramid Type
16' x ¼" Bertsch Initial Type Bending Roll
20' x 1" Hilles & Jones Pyramid Type Bending Roll

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Size 186
12' x ½" Dreis & Krump, Motor Driven
14' x ½" Dreis & Krump No. 268

BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity Cincinnati All Steel Press Brake 10'x⅜"

CAR PULLER
Clyde Double Drum Electric Car Puller, Capacity 45,750# Max. Starting Pull

CRANES—OVERHEAD ELECTRIC TRAVELING

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10 ton P&H	35' Span 230 Volt D.C.
10 ton Shaw	72' Span 230 Volt D.C.
15 ton OCT	45' Span 220/3/60 A.C.
15 ton Shaw	73' Span 230 Volt D.C.
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30 ton Whiting	60' Span 230 Volt D.C.
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#8E Bliss, 290 ton, 16" Stroke, Bed Area 108"x60"

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750 ton Bliss-Toledo Model 181-S Toggle Action Press, 42" Ram Stroke, 29" Blankholder Stroke, Bed Area LtoR 65", FtoB 60", Elecl. Equip.

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Style W Cleveland Single End, 60" Throat, 312 Ton With Attachment for Dishing Heads

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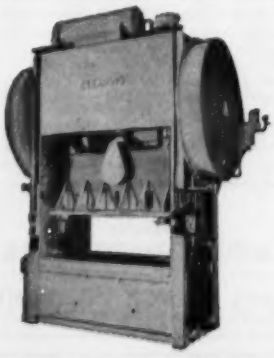

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1	1200	G.E.	MCF	600	350/790
4	800	Whse.	Encl.	525	600
1	800	Whse.	Mill	300	250/550
5	700	Whse.	Encl.	250	300/700

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3	50	Whse.	SK-131.5	230	600/2200
3	25	Whse.	SK-93	230	1800
4	10	Whse.	SK-91	230	250/1000
4	5/7½	Rel.	T.E.F.C.	230	337/1350

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1	300	Whse.	3	11,500-460
1	300	Al. Ch.	3	4600/2300-115/230
3	333	G.E.	1	12,200/11,880-2300/4000
3	400	Whse.	1	22,000-2300
3	1000	G.E.	1	22,000-2300/4600
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2	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	293
1	700	A.C.		2300	500
1	500	G.E.	M-574Y	6900	900
1	500	G.E.	MT-412	2200	580
1	500	Whse.	CW	550	350
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	MT-442Y	2200/4000	253
2	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-5508	2200	1800
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ADVERTISERS IN THIS ISSUE

An asterisk (*) beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturers for your copies today.

A

Adelphia Equipment Company... 168
Air Products, Inc. ... 82
*Ajax Electric Co., Inc. ... 4
*Allegheny Ludlum Steel Corp. ... 162
Allis-Chalmers Mfg. Co. ... 64
Aluminium Limited Sales, Inc. ... 23
*American Gas & Electric Co. ... 159
American Monorail Co., The ... 70
*American Non-Gran Bronze Co. ... 138
*American Wheelabrator & Equipment Corp ... 161
*Armco Steel Corp. ... 6
Armel, James P. ... 168
Armstrong Bros. Tool Co. ... 174
Associated Spring Corp. ... 8
Atlas Car & Mfg. Co., The ... 133

B

Babcock & Wilcox Co., The, Refractories Div. ... 35
*Barium Steel Corp. ... 29
Barnes, Wallace, Co., Div. Associated Spring Corp. ... 8
Barnes-Gibson-Raymond, Inc., Div. Associated Spring Corp. ... 8
Belyea Co., Inc. ... 169
Bankart Steel & Supply Co. ... 171
Bennett Machinery Co. ... 168
Bethlehem Steel Co. ... 1
Birdsboro Steel Fdry. & Machine Co. ... 44
*Blanchard Machine Company, The 80
Bliss & Laughlin, Inc. ... 36
Botwinik Brothers of Mass., Inc. ... 171
Bound Brook Oil-Less Bearing Co. 107
*Brainard Steel Div., Sharon Steel Corp. ... 63
Bristol Brass Corp., The ... 16
Brooks & Perkins, Inc. ... 171
Brownell, Hazard, Machine Tools, Inc. ... 168
*Buckeye Tools Corp. ... 122
*Buffalo Forge Co. ... 165

C

*Carborundum Co., Abrasive Div. Between Pages 64, 65
*Carlson, G. O., Inc. ... 128
*Carpenter Steel Co., The ... 32
*Chambersburg Engineering Co. ... 24
*Chicago Rawhide Manufacturing Co. ... 90
*Cincinnati Bickford Tool Co., The 12
Clemcor, Inc. ... 169
*Cleveland Tramrail Division, The, Cleveland Crane & Engineering Co. ... 134
Cleveland Steel Tool Co., The ... 174
Cold Metal Products Co., The ... 50
Colorado Fuel & Iron Corp., The, Wickwire Spencer Steel Div. ... 164
Columbia-Geneva Steel Div., United States Steel Corp. Between Pages 16, 17
Columbia Tool Steel Co. ... 138
Consolidated Railway Equipment Co. ... 171
*Cooper Alloy Corp. ... 120
*Copperweld Steel Co., The Inside Front Cover
Crawford, F. H., & Co., Inc. ... 168
Crucible Steel Co. of America ... 72
Cutler-Hammer, Inc. ... Back Cover

D

Delco Products Div., General Motors Corp. ... 30, 31
Dempster Brothers, Inc. ... 42, 43
Detroit Stamping Company ... 84
*Diamond Manufacturing Co. ... 174
Donahue Steel Products Co. ... 167
Dony, D. E., Machinery Co. ... 168
Dreis & Krump Mfg. Co. ... 174
Dunbar Bros. Co., Div., Associated Spring Corp. ... 8

E

Eastern Machine Screw Corp., The 174
Eastern Machinery Co., The ... 168
*Eaton Mfg. Co., Reliance Div. ... 137
Electric Equipment Co. ... 168
Electro Manganese Corp. ... 66
*Erie Manufacturing Co. ... 41
Espen-Lucas Machine Works, The 173
*Ex-Cell-O Corporation ... 142
*Exide Industrial Div., The, Electric Storage Battery Co. ... 47

F

Falk Machinery Co. ... 168
Fate-Root-Heath Co. ... 123
*Federal Bearings Co., Inc. ... 66
*Fellows Gear Shaper Co., The 88, 89
*Fenn Manufacturing Co., The ... 112
Finkl, A., & Sons Co. ... 34
Foster, Frank B., Inc. ... 169
Foster, L. B., Co. ... 170
Frank, M. K. ... 171

G

Garner, John G. ... 170
*Gerrard Steel Strapping Div., United States Steel Corp. ... 86
Gibson, Wm. D., Co., Div. Associated Spring Corp. ... 8
Glazer Steel Corporation ... 171
Goodman Electric Machinery Co. 170
Goodyear Tire & Rubber Co. ... 10
Goss & DeLeeuw Machine Co. ... 173
Gray, G. A., Company ... 139
Great Lakes Steel Corp. ... 67
Griffin Manufacturing Co. ... 173
Gulf Oil Corp. ... 28
Gulf Refining Co. ... 28

H

Harrison Personnel ... 172
Henry, A. T., & Company, Inc. ... 167
*Houghton, E. F., & Co. ... 37
Hughes, Arnold, Co. ... 170, 171
Hyatt Bearings Div., General Motors Corp. ... 76
Hyman, Joseph, & Sons ... 167
Hyman-Michaels Co. ... 170

I

Illinois Gear & Machine Co. ... 135
*International Nickel Co., Inc., The 163
Iron & Steel Products, Inc. ... 166

(Continued on Page 174)

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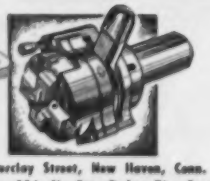

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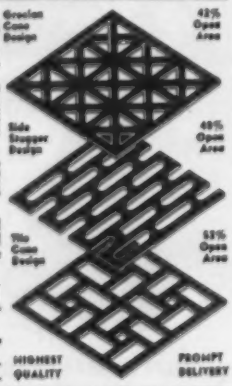

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ADVERTISERS IN THIS ISSUE

(Continued from Page 173)

J

*Jones & Laughlin Steel Corp....85, 131

K

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Chemicals Div..... 26
Kaplan, M. S., Company..... 149
Kasle Steel Corporation..... 170
*Kaydon Engineering Corp., The.. 115
*Kemp, C. M., Mfg. Co., The..... 87
Kidde, Walter, & Co., Inc..... 13
*King, Andrew, Co., The..... 164
Knox, Earl E., Co..... 168
Kling Bros. Engineering Works... 78

L

Lamson & Sessions Co., The..... 74
Land, L. J., Inc..... 168
Landis Machine Co., Inc.....14, 15
Lang Machinery Co. 168
Lansing Stamping Co..... 66
*La Salle Steel Co..... 118
Leland-Gifford Co. 174
*Lincoln Electric Co. 45
Lurie Bros. & Co., Inc..... 147

M

McKay Machine Co., The..... 25
MacCabe, T. B., Co..... 169
Martin, Joe, Co., Inc., The 171
*Master Builders Co., The..... 140
Mesta Machine Co.....Front Cover
Mexico Forge 172
Miles Machinery Co. 167
Mississippi Valley Equipment Co. 170
Monsanto Chemical Co. Plastics Div. 27
Morgan Construction Co. 5
Morrison Railway Supply Corp.... 171
*Mundt, Chas., & Sons 173
Murray Company of Texas, Inc., The 171

N

National Machinery Co. 38, 39
National Machinery Exchange.... 168
National Steel Corp. 67
*New York & New Jersey Lubricant Co. 140
*Niagara Machine & Tool Works 18, 19
Northern Engineering Works..... 109

O

*O'Neil-Irwin Mfg. Co. 9
*Ohio Crankshaft Co., The..... 33
Ornitz Equipment Corp. 170

P

Papesch & Kolstad, Inc..... 168
Parkinson & Sons 169
Perkins Machine & Gear Co..... 130
*Philadelphia Gear Works, Inc.... 126
*Platecoil Div. of Tranter Mfg., Inc. 125
Plymouth Locomotive Works, Div. of The Fate-Root-Heath Co. 123
Purdy Company, The 169

R

Raymond Manufacturing Co., Div. Associated Spring Corp. 8
Ready-Power Co., The 119
*Red Seal Metals Co..... 11
Republic Machinery Co. 168
*Republic Steel Corp. 20, 21
Research-Cottrell, Inc. 160
Russell, Burdsall & Ward Bolt & Nut Co. 69
Ruthman Machinery Co., The..... 108
Ryerson, Jos. T., & Son, Inc..... 48

S

Sandusky Foundry & Machine Co. 124
Sandvik Steel, Inc. 141
*Schrader', A., Son, Div., Scovill Manufacturing Co., Inc..... 17
Sessions, J. H., & Son..... 116
*Simmons Machine Tool Corp.... 136
Standard Iron & Steel Co..... 170
*Standard Pressed Steel Co..... 121
Stone, R. J. 168

T

Tennessee Coal & Iron Div., United States Steel Corp. Between Pages 16, 17
*Thermal Research & Engineering Corp. 132
Timken Roller Bearing Co., The.. 40
Towmotor Corp. 110
*Trabon Engineering Corp. Inside Back Cover
Tractor & Equipment Co..... 170

U

United Aircraft Products, Inc..... 136
United Engineering & Foundry Co. Between Pages 80, 81
United States Steel Export Co. Between Pages 16, 17
United States Steel Corp. Between Pages 16, 17, 86
United States Steel Supply Div., United States Steel Corp. Between Pages 16, 17

V

Vanadium Corp. of America..... 171
Virginia Gear & Machine Corp... 126

W

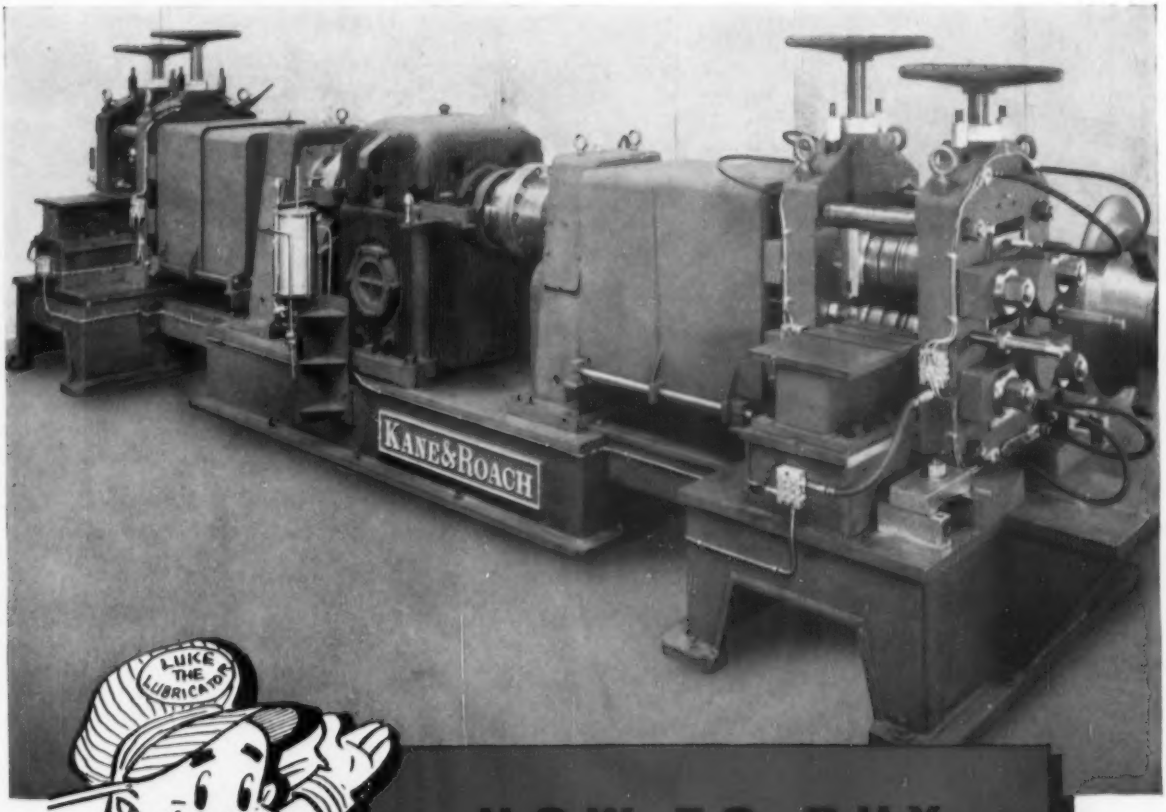
*Wagner Electric Corp. Between Pages 16, 17
Wallack Bros. 171
Weiss Steel Co., Inc..... 171
Wheland Co., The 116
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Corp.... 164
Williams Machinery Company.... 167
Wilson Products, Inc. 117
Windemere Sales Co. 170
*Wysong & Miles Co..... 111

Y

*Yoder Co., The Between Pages 80, 81
Youngstown Sheet & Tube Co., The 22
*Youngstown Welding & Engineering Co. 164

CLASSIFIED SECTION

Business Opportunities 172
Clearing House 166-171
Contract Manufacturing Appears in first and third issue of each month. See May 5 & May 19
Employment Exchange 172
Wanted 171



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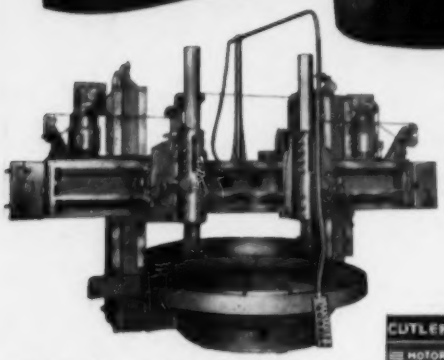

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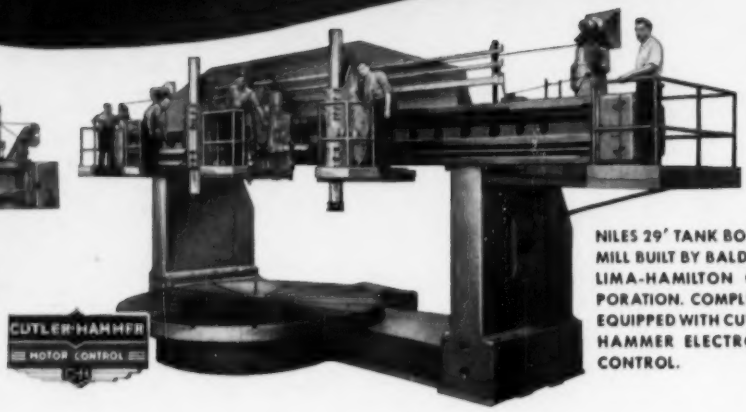

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